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THE

EDINBURGH DISSECTOR.



EDINBURGH DISSECTOR:

OR

SYSTEM

OF

PRACTICAL ANATOMY;

FOR THE

USE OF STUDENTS IN THE DISSECTING ROOM.

BY

A FELLOW OF THE COLLEGE OF SURGEONS
IN EDINBURGH.

J. B. BAILLIÈRE, LONDON: P. RICKARD, EDINBURGH.

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MATERA.

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ADVERTISEMENT.

The following work is exclusively intended for the student of anatomy whilst engaged in the dissecting-room. Besides containing a careful digest of the anatomical facts compiled by Winslow, Bichat, Soemmering, Cloquet, and Meckel, whose texts have been respected (and are here fully acknowledged) wherever it suited the practical nature of the work; the author hopes, that by the extent of its practical instruction, it will be found to supply that desideratum so much wanted by anatomical students, viz., a Dissector's Manual.

September, 1837.



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EDINBURGH DISSECTOR.

PART I.

DESCRIPTION OF THE BONES.

INTRODUCTORY REMARKS.

A KNOWLEDGE of the anatomy of the human frame, which is now deemed essential to a right understanding of its diseased conditions, can be best acquired by combining attendance on the lectures of an experienced anatomist, and by actual dissections in practical rooms.*

If the student be left to his own judgment in the selec-

^{*} Schools of anatomy are of two kinds. 1st, Those magist by maked men. 2d. These neight by persons who merely know the details of human structure; and who, having never applied the art to any practical purposes, i. c. larring never practiced as physician or surgeon, repeat in a formal and dull manner, often with much pumposity and in a Quixotic style, the opinions of others, at second hand of course, busing no experience of their own ; and they further generally resort to empirical methods of tenching, such as by enlarged views or diagrams, arrificial armagements to sid the memory, &c. They are in fact mere grinding schools of austomy, and although now a little lackneyed, and the trick is summand state, they still oursed incredibly with the inexperienced student, who orldom reflects on the astounding fact that the isoturer may not only be a worse commend person than himself, but actually totally ignorant of the urts of ourgery and physic

tion of his teacher (which, however, is seldom the case), he ought to prefer the teaching of those who are known to have practised physic and surgery, and to have applied their anatomy to practical purposes. Those who study merely from lectures are frequently clear, distinct, and philosophic in their ideas of matemy, but they enanot apply the art to surgery or physic; whilst those who have studied merely to the dissecting room, analysis by lectures, are generally throughout life narrow-minded, empirical, and behind the ordinary current of knowledge; they usually room empirically, without clovated views, and despise the asperience of others. The student is recommended to combine both methods of anody throughout the whole course of his medical addication.

2. The human skeleton, as usually first presented to the Student by the Lecturer on Anatomy, consists of the Boss of an adult resson, which have been cleaned of all soft justs by long maceration in water, dried, and articulated: the entire excleton, when my articulated lated, will go into a very small compass; a box twenty inches long by seven inches broad, and seven or eight inches in dopth, will easily contain it. When articulated, it gives a very accurate outline of the human buily when fully clothed with all the soft parts; and thus the student perceives how the skeleton has been described as a frame work, affording at once support. and protection to the soft parts, giving to the body its general form, and hotly, when acted on by the muscles, erving the purpose of a series of levers, and hence denuminated the passive organs of locomotion.

3. The student requires to study the bones in a great variety of ways. The extendogy of the body must be described from a set of bones which have been simply exactated the age of the individual to whom they may have belonged should be from 25 to 35 years of age, and who closing life had been afflicted with no discose affecting the huma more particularly. The attendary motions must be entire, untouched, and no artificial means wood to whiten or polish the texture. The articularly shelden, by which is mount the huma connected together by means of from or breast wire, and suspended in a frame, must also be studied. Many of

the joints can thus he very successfully imitated, and the preparation is extremely useful—indeed essential, although in unny points faulty. The flexibility of the spios, for instance, and cartilages of the ribs, &c. cannut be imitated.

4. In comparative, and in a certain extent in human anatomy, the bonce are often preserved cannected together by their own proper ligaments, and in this state constitute what is called the Natural Skeleton. If it were possible to preserve it without being dried this would certainly be by far the most purfect; but this is evidently repossible with a bulky skeleton as that of the human adult; the process of drying alters altogether the natural appearance and properties of ligaments and cartilages, so that this preparation would be much less instructive than the artificially articulated one, and a never prepared excepting in foctores—children and small animals generally.

5. The bones prepared by maceration, it sound, are extremely hard, even when first removed from the moestating tub t but in consequence, no dualst, of the drying up of that cartilaginous substance, which forms the basis of all benes, in process of time they become considerably harder. They are also very light, baving lost a large quantity of fluids, and, if well prepared, they are of a dell white culture, and from from all apprehence of oil. When first featured from the macerating tub, however, a slight reddish trops out to

observed.

6. The student will, herly, particularly remember that the maceration has together with all the soft parts, destroyed a dense strong fibrous mambrane (the partusionm) which every where invests the ossous texture. This membrane the student will find covering the fresh bones in the dissecting room.

SERLETON IN GENERAL.

7. When a section of a long bone is made, such as the thigh bone, the interior is observed to present a collular appearance, particularly at the extremities: this is called the concelli, callular and reliculated structure of bones, whilst to the section of a flat bone, exhibiting interiorly a finer net work, the term diplor or meditallium has been employed. The student requires to be informed, however, that during life the whole of the interior of all bones, even the cells which are perfectly microscopic, is lined by an extremely delicate membrane, in all probability mostly composed of blood vessels, whose office appears to be as accrete an oily and highly inflammable semi-finid of a light cream colour. This substance is the marrow or medula of bones. In certain discuses this oily juice seems to become entirely absorbed.

8. The osteogeny or original growth of home is unquestionally one of the most interesting subjects which can be presented to the anatomist. Its difficulty may be appreciated by gluncing at the formidable lists of authors who have written on the subject, but it will be best understood by visiting the museum of an anatomical teacher. The number of preparations may readily exceed a thousand, and yet not elocidate a tenth part of the interesting phenomena connected with the

healthy and diseased conditions of bone.

(9. The skeleton is at the first, i.e. during the early part of fostal life, cartilaginous, and in the areobe or vacuities of this soft cartilaginous basis an mert salino-terroons substance, composed chiefly of phosphate of lime with a little carbonate of lime, is gradually deposited. This deposit is regulated by fixed laws, and takes place at various points, sometimes simultaneously, in other cases irregularly. (The eminences observed surmounting most of the bones grow or rather harden from a central point proper to them, and at the age of 14 or 15, ulthough the skeleton may have acquired its full bulk, these will be found separate from the greater mass of the bone. (These separate portions, when found in this state, have received the name of epipleyses.) At a more advanced age they all unite, so as to form one bone, but even then, presenting a cougher less finely finished appearance, their distinction from the body of the home can readily be detected, and the term; apophysed or process is given to most of them.

10. The following table had better be committed to memory by the student, or carefully studied at the very

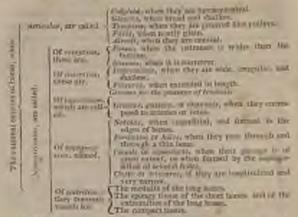
THE EDINGUEGH DISSECTOR.

commencement of his studies; it contains an enution of the various processes found in the skeleton. These terms are in constant use in the dissecting room; and if the student is not perfectly familiar with them, he may actually know a deal of anatomy without being able to masse a single part.

According to their temporal countries of a part in the countries of a part	PRINCESSES	These which to- ing to the ing to			than is the other. See of Deanstean as in the losse of the comman. Rolling as in the bests. Rolling as in these is these articulations estimate columns.		
Provide of explanation .			the offeriors of certain matter which doctors the row their region care. of too, are called:	to their general serm, form, form, form, formed to their conting to their direction and other directions.	of a grant number of amilit talgeties placed very core tagethes, and manufact by their depressions. Linear, temperal sections, long test not very preceding to the core processions, resembling from the talgets and more processes. Possessions of the forest processes, then they make the section of the tagets of the possess of the tagets of the possess of the tagets of the tagets. Internal, the a tagets. Internal, the a tagets. Internal, the a tagets. Internal, the a tagets. Internal of tagets. Internal of tagets. Internal of tagets. Possessions, or these white size colours and tagets. To describe the special life orbit, he. Advantage processes. Possession, in.		

11. The honor also present various pavities on their surfaces, and it is uqually essential for the student to be

familiar with the terms amployed by anatomists for those. The following table comprises the whole.



12. The bones composing the skeleton are symmetrical, being either median and single (admitting of being divided into two equal halves), or lateral and in pairs, and which singly are not symmetrical.

The skeleton may be divided into

I. Trunk.

Extremities.

(1.) The trunk is subdivided into a middle part, with its upper and lower extremities or subdivisions. middle part includes the cervical, dorsal, and lumbar vertebrae ribs and sternum. The upper extremity of the trunk is the head; the lower extremity is the pelvis.

(2.) The extremities (in summon language, arms.

logs.) are in fact appendages to the trunk, and are The superior—thorneic extremities or arms.

2. The inferior-polyle extremities or legs.

13. The enumeration of the bones of the adult skeleton is as follows :-

- 7 Cervicul vertibres.
- 12 Dorsal vertelens.
- 5. Lumbur verfelme-
- 5 Sarmi-
- These combined form the privile 4 Coorygent. which is thus compand of obeyon 2 Gasa immuminata. A Lone.
- These with the treslee dereal regulary form 24 Ribs. the thorax, which is thus composed of thirty. 1 Stemms Saves Jones

1 Orcipital: 7
1 Sphinodal.
I Ethnoid These form the remium which is ma-
i Frontal composed of eight hones-
2 Parietal.
2 Temporal.
2 Superior munithery.
2 Palito:
2 Lachrymal.
2 Malar.
1 Vones.
1 Inferior maxillary bene-
A CONTRACTOR OF STREET
To these, however, may be added the following in
connexion with the head :-
2 Malini,
2 Incudes These are included within the primer
2 Ossa estocularias (portion of the temporal home.
2 Stapeles.
1 Os hyutdes, asspended to the tomporal hour.
82 Toolh, each row supporting statem of these,
The superior, theracte, pectoral currentles as arms, are warh
And dispersor, mostere pectors continues as arms, an early

Forcario and Hard1 Clavele1 Scannia Constituting the shoulder

1 Hunerus. The arm-

I Una ? The forearm

1 Scaphool 1 Semilous

These eight bones compase the copal region, and are arranged in two arches, one within the other, the two external arch in

Pysamidal within the other; the Disform. harmed of five house

Marman, The small interest such is composed of

L Traperroles

Meta-sepal bings compasing the meta-carpol region, and named in their numerical order, first, exceed, one, counting from the radial or extremal side of the arm, towards the internal or alone.

The small way is in middivide the cargol into two rows of line bapes cost, but that this is not a practical view, my one may emily themselves by examining the articulated corpol busis from the dorsal tegion.

(1) Phalangeal boxes eager into the composition of the fingers; each finger has three of these boxes, excepting the thumb which has only two; and in reference to each finger the

hones are designated province, middle, and distri-

There are always in the adult subject two small boses playing an important part in the articulation between the metacarpal bose and proximal phalanges of the thumb; but as in atout men similar bones are developed in the came situation in the fingers, they had better perhaps not be included in the enumeration-

The Inferior, Pelvic, Abdominal extremities or Legs, are divided by anatomists into three regions, viz. Thigh, Leg, and Foot.

I Femus. Comptsing the region of the thigh-

1 Fiboh. Compasing the region of the leg-

I Astrogalus.

1 Calcaneum.

1 Naviculare-

I Cabaid.

I Internal convilorm.

These seven bones compare the tarsal region of the foot.

1 Middle cureiform, 1 External emeriorm.

5 Metatarial boxes composing the metatarial region of the foot, and somed in their numerical order, first, serous, &c., counting from the Tibal or internal side of the Leg towards the external or Fibalar side.

14 Praintipes enter into the composition of the time, each toe having there of these boson excepting the great toe which has only two; and in reference to each toe the boson are.

slengtuited, proximal, middle and alistol.

Patella or Rombs, Knor Cap. This bone is always articulated with, and enumerated by all anatomists as a hone of the skelester. They have overlooked, however, many other lones of a similar nature which are found in the human hody equally constant. The two alluded to in reference to the thund, and a similar pair constant with the great too, are hones in every respect analogous to the Patella.

The student will be struck with the great similarity of the Arms and Legs even in man. The Lags have such two hours fewer than the Arms, but the two Ossa famounts as assured the Legs to the Sarram, and these are evidently structly analogous to the shoulder, in which are included the scapaths and slavides.

ABSTRACT.

 Thus the Adult Skeleton as generally men in Museums, consists of

Vertebus (Azygos hones) Osas impuninata (in pairs)

32

Ribs in pairs, 24, and stemum (see Cranial and facial (seygos). Ditto (in pairs)	ygos) I,	-	8=1	95 6
Bone of the internal car (in pairs Bone of the trages Teeth, bones of mattenation		-	-	8 1 32
Superior extremities (in pairs) Inferior extremities (in pairs) - Sesamoid biones (Ostrodes) counter	ed with b	ch ex	tremities	100
Tand m	mber			0.01

OF THE VERTERRAL COLUMN.

15. The Vertebral or Spinal Column, is a bony pillar, placed at the posterior and central part of the trunk, and extending from the head to the terminating coercygoal bone. It may be conveniently subdivided into two great divisions, a superior and inferior. The superior is flexible, and composed of twenty-four bones, or true vertebrae; the inferior usually more fixed, is composed of nine bones, or falso vertebrae. Although usperiorly capable of hending in all directions, it is yet very solid, and is excavated throughout its whole length by the spinal canal which ledges the spinal marrow. It is rounded in front, irregular behind, and perforated

on the sides with a great number of holes.

16. The superior division of the column is composed of twenty-four short and very angular bones, placed one above the other, named Verlebra; and twenty-two fibro-cartilages situated between the bodies of these vertebras, at once connecting them firmly to each other. and contributing considerably to lengthen the column. The elasticity and flexibility of this part of the spine depends entirely on the presence of these fibra-curtilaganous hedies, and as they cannot be well preserved in the skeleton artificially articulated, some other means of connexion are used, such as pieces of cork, putty, co-All three artifices have the great disadventage of proventing the student noticing one of the most remarkable. properties of the column, viz. its ifexibility and elasticity. The inferior division of the spine is divided into two regions, a sagral and encoygoal. These in the adult are usually neither flexible nor elastic; the sacral vertobre are peculiarly fixed.

OF THE VERTERRE IN HUSERAL-

17. The upper division of the vertebral comma has been divided by anatomists into three regions, although the individual vertabese composing it, are in a remarkable degree similar to each other. They do differ, however, and we shall select the first lumbur as proventing the general characters with fewest exceptions. We have a superior and an inferior surface, an unterior and posterior surface, and two lateral surfaces. A cylindrical or eval, thick and broad mass marks the anterior aspect, and it has been named the body of the bone, trunsversely convex in front, elightly concave from above downwards, flattened superiorly and interiorly, and which flat surfaces are articular, corresponding to the inter vertebral fibro-cartilages. From the sides of this eylindrical body, right and left, arise a strong processnamed the pedicle, contracted superiorly and interiorly, and these contractions receive the name of consumar or notches. These pedicles are separated from each other at their origin posteriorly, to the extent of about an inch, and this interspace formed by the body is here rather flattened, forming the anterior wall of the spinal canal. Projecting laterally nearly at right angles from the pedicles, we observed two transverse processes : from the same pedicles, but projecting upwards, we have two processes, (apperior articular,) whilst other two processes project downwards, (inferior articular,) from these common roots two broad lawing pass toward the mosial line, which uniting, form a projecting and more or less prominent spinous process. The whole of these processes thus united in the speacous, are set off from the body in such a manner as to leave a short but wide canal, named the vertebral foramen, when speaking of a single vertebra, but which, when the vertebraare articulated with one another, concur to form the syunal canal, whilst the incisure or noteles pointed out on the sides of the podicles form the intervertebral foramina, or foramina of juxta-position (conjugalia,) and admit of the escape of the nerves from the medulia spistalin.

OF THE PARTICULAR VERTERRE.

18, The Cervical Vertebrae (seven in number) are smaller than the others. They have their body elongated transversely, a little thicker anteriorly than posteriorly. and on the sides than in the middle; concave above, and surmounted laterally by two small projecting lamina; convex below, and presenting two superficial motehes on the sides, which correspond to the laminoof the upper surface. Another peculiar character which the budy of these vertebrae possesses, is, that its upper surface is broader than the lower, whilst in the other vertebras it is the latter which is the more extensive. The body is also lower than in the dorsal and Jumbar vertebrue. The spanous process is bilipreated, horizontal, and short. There is a link for the passage of the vertetiral artery at the base of the transverse processes, which are short, billd at the summit, and present a channel above, in which he the servical nerves, after having escaped from the spinal canal. On account of the hole which passes through their base, these processes seem as If they had two roots, one of which arises from the body itself. The inferior orticular processes are of an oval form. somewhat concave, and are directed forwards and downwards; the superior are also eval, but present opposite characters. The Lawing of the cervical vertebrae are longer and narrower than those of the others, and conour to render the vertebral foramen proportionally larger. and of a triangular form, with the angles rounded. Their upper circumference is formed by a sharp edge, and is smaller than the lower, which seems to embrace the vertebra situated beneath. The notches are anterior to the articular processes.

19. The First Cervical Fertebra or Atlas is peculiarIt presents the form of a ring which is more or less thickensed at the sides, and is formed anteriorly by a small
compressed arch, which does not occupy more than a
fifth part of the circumference. It is convex and tobercular anteriorly, concave in the opposite direction
where an oval articular surface is observed, which conments it with the tooth-like process of the second vertabra. This arch is thin above and below, and gives insertion to ligaments. Posteriorly, the ring is complet-

ed by a larger bony arch, which also gives attachment to ligaments above and below, and which is tubercular behind for the insertion of the posterior small recti muscles of the head. This arch is rounded and thick behind, but unteriorly, where it joins with the rest of the vertebra, it is depressed and marked above with grooves for the vertebral arteries and subsoccipital nerves. and below for the second pair of cervical nerves. The atlas has moreover a large vertebral forumen, divided by alignment into two portions; of which the posterior alone contributes to the formation of the spinul canal. Two irregular tubercles, on the inside of the upper articular processes give attachment to this ligament. The notches are here situated behind the articular processes, which are nearly horizontal and very broad. The superior, which is concave, uval, and inclined inwards, is articulated with the occipital bone; the inferior, which is nearly plain, is also inclined inwards, and is connected with the second vertebra. The transverse processes are very long, terminate in a more or less obtuse point, and rise by a double root, of which the anterior branch is more slender, the posterior longer and thicker. hole in their base is larger than in the other cervical vertelson.

20. The Second Vertebra or Axis is also peculiar. has a nearly triangular circumference. The hody is much leigher than broad, and is marked anteriorly with a central ridge and two bollows for the longi colli muscles. From its upper part rises a long, rounded, vertical projection, named the edostoid or tooth-like process, which is articulated before with the unterior arch of the atlas, and is marked behind with a small convex surface for sliding on the transverse ligament. The spinous process is very large, and is marked below with a broad and deep channel. The upper notches are placed much farther back than the loner. The superior articular processes are nearly horizontal, inclined a little outwards, and convex: they are broader than the inferior, which are turned forwards and downwards. The transverse processes are short, and are neither hiforcated nor channelled; they seem to arise from the superior articular processes, and their base is perforated by a short canal, for the vertebral artery, which has

an oblique direction outwards. The lawise are thick and strong.

21. The Secenth Pertebra (nortebra prominens,) differs from the rest only in being larger, and in having its spinous process more elongated, and commonly not bifurcated, as well as in the circumstance of the hole in the base of its transverse processes being generally smaller than in the other vertebra; or even altogether wanting. The vertebral artery does not pass through this opening even when present, but the vein generally does.

22. The Dorsal Vertebra (twelve in number) diminish in size from the first to the fourth or fifth, and then increase to the last, so that the fourth and fifth are always smaller than the rest. Their body has a greater diameter from before backwards than transversely, except in the two first, and two or three of the last, is thicker behind than before, and very convex at its middle and fore part: its upper and lower surfaces are flat, the former of which is narrower than the latter. On its sides it generally presents two demi-articular facets, the upper being the larger, to which the heads of the ribs are articulated. In the first nine dorsal vertebre, the upper and lower surfaces of the body are heart-slaped; but in the rest they are rounded. The spinous processes are lung, of the form of a triangular prism, tubercular at the summit, inclined downwards. and imbricated. The transverse processes, which are very long and thick, are directed a little backwards. Excepting in the two last, their summit presents a rough tuberele, surmounted by a concave and eartilaginous facet, to which is articulated the tuberosity of the ribs. This facet is placed sometimes higher, sometimes lower, according to the vertebrae; but in the upper vertebrae, it is generally directed downwards, and in the lower upwards. The superior articular processes are directed buckwards, the inferior forwards; they are situated vertically above one another. The noteker are larger than in the cervical vertebrae, and situated anterior to the articular processes. The vertebral forance is no longer triangular, but of an aval form from before backwards. and is smaller than in the neck. The lassing are broader and thicker,

28. In the dorsal region, there are distinguished as

peculiar:

24. The First Darset Vertebra, of which the body is more extended transversely than from before backwards, and on the sides presents a complete costal impression above, and a half cavity of the same nature below, which, together with a similar half cavity in the second dorsal vertebra, forms a whole articular surface for the head of the second rib. The spinner process is thick and long, with a tubercular extremity, and is nearly horizontal in its direction. The articular processes are oblique.

 The Tould Dorsal Pertebra, has an entire articular surface on the upper part of either side of its body, for

the tenth rib."

26. The Eleventh Dorzal Vertebra is remarkable for its size. Its body, which is almost round, approaches much in its general appearance to the lumbar vertebrae, and prosents on each side, towards the pedicle of the transverse and articular processes, a single entire depression for the eleventh rile. The spinous process is short, broad, and somewhat horizontal. The transverse processes have no articular surface at their extremity.

27. The Twelfth Dorsal Vertebra presents exactly the same characters as the eleventh, only its transverse processes are shorter, and the lower articular processes convex and turned outwards, like those of the lumbar

vertebru.

28. The Lucker Vertebra (five in number) are remarkable for their size. Their hody has greater breadth than height, more extended in the transverse than in any other direction, the fourth and fifth thicker anteriorly than posteriorly, that above and below, without lateral facuts, cancave from above downwards on its fore part, or rather bordered by two ridges, one above, the other below. The spinous process is broad, nearly horizontal, transversely flattened, and quadrilateral, the lower margin thicker than the upper. The transverse processes are thin, long, and also horizontal, and placed on

^{*} When this is the case, the ninth verselon must also differ from the others in having a ball articular surface only, on the side of its body, and that too on the opper part; this surface is, however, pretty large.

a plane anterior to the transverse processes of the dorsal vertebras. The articular processes are large and elongated; the apper are much separated from each other, concave, oval, and turned inwards; the lower are nearer each other, and embraced between the two upper ones of the vertebra beneath, are convex, oval, and directed outwards. The sotches are large, especially below; the laminer thick and broad, but shorter than in the other regions; the verlebral forumes broader than in the back, and of a triangular form.

29. The fifth lumbur vertebra is much thicker before than behind, the lower surface of its hody being cut obliquely upwards, it articulates with the first sacral vertebra which we shall find our obliquely downwards and backwards, and thus producing a remarkable and important angle, the sacro-vertebral angle, or promontory of the sacrum. The inferior division of the spinal column, composed of five sacral and four coccygoal vertebrae, ought properly to be described here; but unwilling to depart from the usages of most anatomists, we shall describe these verteline as a portion of the pelvis.

30. The spinal column in a child is nearly straight, and is very differently shaped from what it is in the adult-In the forms, or in a child shortly after birth, the broadest part of the column is superiorly or in the cervical region, and the apex is downwards or inferiorly in the sacral and energical regions. In the adult, its general form is that of a pyramid also, but the base is below. Some have functed it to represent three, pyramids, and those persons do not include the sucrum as forming any part of the spinal column. The column, when articulated and viewed from before, will be observed to present in various parts contractions and lateral expansions. The first expansion occurs at the first dorsal vertebra, and here those persons find the base of two of their pyramids, one, including the five superimposed pervical vertebrae, the other formed by the four succeeding dorsal vertebrae; a contraction will be observed between the fourth and fifth dorsal vertebre, (22) and here they find the spices of the second and third pyramids; from this point the bodies of the vertebras increase in all their dimensions until the first sacral, where, of course, the base of the third pyramid is placed. View-

ing the sacrum and coccygnal bones, as component parts of the spinal column, we add another pyramid, composed of the sagral and coccygoal vertebra, whose base is superior, and apex inferior, thus making four pyramids instead of three. The adult spinal column viewed laterally is convex in the neck, concave in the back, convex in the loins, and again concave in the pelvic region. The column should be perfectly perpendicular in one sense, that is when looked at from before or from behind, so that if divided with a saw in its long axis, the two sections will be perfectly symmetrical; when it deviates to the right or left, however little, it is still a deformity, and is called zeolioris or lateral curvature : this deformity is common in the storsal part of the column, the convexity being to the right side, and the concavity to The frequency of this and other curvatures of the spine has been ascribed to many causes, and undoubtedly does arise from a variety of causes, but we apprehend that a congenital want of symmetry in the two sides of the body is by much the most frequent source of the deformity. The posterior aspect of the vertabral column presents two long grooves called vertebral gracers, in these lie the large erector muscles of the spine. On its anterior aspect, are placed of course nearly the whole of the viscera, either laterally or directly upon it.

31. Fertebral Canal. This cannot extends along the whole length of the spine, following its various curvatures, and placed nearer its posterior than its anterior part. Above, it is continuous with the cavity of the skull; below, it is open posteriorly, in consequence of a deficiency in the osseous ring of the last speral and of all the coveygeal vertebra. The canal, whilst traversing the sacrum, is usually called the sacral canal. It is wide in the neck and in the upper part of the back, it then contracts to be again enlarged in the lains. It is trangular above and below, and rounded in the middle.

32. Anteriorly, it is formed by the posterior part of the bodies of the vertebre, which are covered by the posterior vertebral ligament. Posteriorly, by the vertebral lamins and the boles that occur between them; and on the sides, the inner part of the turnsverse processes, and the intervertebral formulas, are the objects which it presents.

33. The spine, which combines lightness with aubidity and dexibility, serves to support the head and chest. It is the seat of all the motions of the trunk, of which it transmits the weight to the pelvis. It lodges and protects the spinal marrow and the membranes which invest it. It gives possage to the spinal nerves and to many vessels. It affords insertion to numerous muscles and ligaments, both anteriorly and posteriorly.

34. No very accurate measurements exist of the length of the spinal column, but it is generally considered to be more than a third of that of the whole body,—the corvical region measuring 5 inches, the dorsal region 11 inches, the lumbar 7 inches, and the saural and coccygeal 3½ inches, but it must vary much in different individuals. There is no ratio of the comparative length of the spine and the extremities that can be depended on.* We have measured the length of the entire trunk, including the head and pelvis when covered with soft parts, and compared this with the total length and breaith of the body, and the results were as follow:—In these measurements the spine is placed on a horizontal plane, and measured without regard to its curves.

Sen	Ago	Total beigh.	Googlest breakth.	Length of truth	Hairo of length of trunk to to- nal length.
Male	Vests No. 1 2 7 0 45 0	7 or 100 2 4 3 10; 5 4	5 tot. Inches. 2 11 3 9 5 10;	Fort ladies.	1.55 1.77
Female Male	45 0	5 5 5	5 10; 5 8	9 10 9 9 8 0	2, 1,97 1,83

35. The development, i.e. change from the cartilaginous to the osseous state of a vertebra, proceeds from six or eight centres. At birth, if maceration is pushed far, we find a vertebra compaced of three separate osseous parts, viz. the body, and two lateral parts of the arch. The extremities of these portions, when looked at, will

^{*} Hence we doubt the accuracy of the medical evidence before the Poor Law Commission, which laboured to show that the erect position so constantly maintained in rotton splanning factories tended greatly to abouten the spiral column. We believe this evidence to be founded upon no correct data.

present a rough grooved appearance, indicative of cartilinges having been there. The lumings have not united in the situation of the spinous process. The pedicles have not united to the body. As uge advances, an osseous exertre appears in the cartilaginous bases, in the situation of the spinous process in the lurch and loine. Similar contres appear at the summits of the transverse processes, and one on each of the articular aspects of the body. These all unite into one mass in the natural healthy arrangement, or they may remain separate to an advanced period of life.

36. The second cervical vertebra has an additional centre for its edontoid process. The seventh has always an additional centre in front of its transverse processes; this in most cases unites, and thus forms the broad transverse process; or, as has been observed by us, and of which the preparations are in our museum, may remain separate, and be developed as a distinct pervical

rib.

THE THORAX, OR CHEST.

 The Thorax is formed of the twelve dersal vertebra, (22) twelve pair of ribs, and the sternum.

38. The Sternson holds the same relation to the rike anteriorly, as the vertebra do posteriorly, and compurative anatomists draw a strong analogy between them. Its direction is from above downwards and forwards, It has been divided by anatomists into three parts, via a body in the centre, a manobrium, or handle, superiorly, a xiphoid, ensiform or sword-shaped appendix, inferiorly. It is nearly symmetrical, clongated, and flattened, varying in breadth and thickness. Viewed separately it presents an anterior slightly convex, and a posterior concave surface, two lateral irregular edges, and an upper and lower extremity. Its anterior surface is marked with four transverse lines; its posterior surface has a porous appearance, and also shows, though faintly, the four transverse lines; its upper extremity is thick, presents a semicircular notels in the centre. Proceeding from this notch on either side, we observe a shallow sigmoid articular surface, inclined outwards and backwards, corresponding, but very imperfective to the

sternal extremity of the clavicle; immediately below this, a rough irregular impression, or very commonly as portion of cartilage, the remains, in fact, of that belonging to the first rib; a sharp edge follows, and then an articular facet for the reception of the eartisage of the second rib, and from which the student will observe the first transverse line runs. This same arrangement will be observed throughout the whole extent of the lateral edges of the bone, the interspace between the five following articular facets becoming shorter and more blantod; the last articular facet being placed immediately at the narrow junction of the xiphoid appendix to the body.

39. The esteogeny of the sternum is most interesting. The original centres of ossification are undoubtedly nine, corresponding with the more highly finished chain of bones forming the sternum of many of the lower animals. In man, towards the interior extremity, the development is evidently rudimentary, the xiphoid appendix assuming a great variety of forms; and whilst we can almost invariably see, in the young person, the separate centres of ossification in the upper part, inferiorly they are generally confounded and irregularly disposed. We have now before us a sternum nearly full grown, in which the centres of ossification are in pairs; and we lean to the opinion that this is always the arrangement, the sternum being open in the centre at a very early period of feetal life. The four transverse ridges generally observed on the adult healthy hone indicate the situation where the various centres were latest in running together.

40. Twelve pairs of ribs (coster) form the sides of the thorax. They present considerable variety in length, and are all more or less twisted on themselves. Anatomists reckon them, and name them numerically from above downwards: surgeons usually from below upwards. The eighth is the longest, and a gradual diminution takes place, not only towards the first but to the last. The eighth may be taken as presenting the more general characters in greatest perfection; and in it, as in the others, we find a body and two articular extremities; an external convex, and an inferior sharp edge. The posterior or vertebral extremity is recognised by

presenting two superficial articular facets, correspond-, ing to each of the half cavities pointed out on the bodies of the vertebrae; the anterior, sternal extremity prosents an eval, rough, estylaid cavity, occupied in the recent subject by a cartilage, which will be seen to be intimately connected with the rib; so much so, indeed, as to resist putrefaction for a very long time, and in some cases remaining after all the soft parts have been removed by macaration. The external aspects of the rili proceeding from the sternal end presents a smooth convex surface, for about nine inches, (in the eighth rih), where an oblique transverse line crosses it, and the convexity of the rib becomes increased; this is named the angle. About two inches from the angle we observe a rough slightly projecting surface, the tubercle or tuberosity, presenting on its inferior surface an articular ovalfacet, corresponding to a similar one pointed out on the apiecs of the transverse processes of most of the dorsal vertebrae; between this articular facet and the vertebral extremity, there is an irregularly flattened, slightly contracted surface, named the neck (cervis) of the rib, which rests upon the front of the transverse process, ternal surface presents near its lower sharp edge a groove. deep posteriorly, where it commences near the takerority, gradually becoming superficial, and losing itself in the inferior edge, about the auterior third of the rib-

41. The first, second, eleventh, and twelfth ribs present slight differences. The eleventh and twelfth are evidently more radimentary. They have no tuberosity; the augle is indistinct or wanting; the internal surface has no grouve; the head presents only a single articufar facet, indicating that they were supported on a single vertebra. They have been called floating ribs, from the circumstance of their cartilages of prolongation being short and not connected to the cartilages of the ribs above, but projecting merely amongst the abdominal muscles. In many instances these muscles are traversed by a tendinous line, precisely in the situation where a thirteenth rib would have been found, if it had been present. The first rib is of great importance, more particularly to the surgeon; it is short, seldom exceeding four inches in length, broader and thicker than the rest, and so slightly twisted, as to fouch a horizontal plane

with its two extremities. From its peculiar positionthe surface, which in the other ribs is external, is in it
experier, and on it we find two important furrows,
corresponding to the subclavian vein and artery, separated mear the sternal extremity and upon its concave
edge by an impression, to which the scalenus anticus
muscle is attached; a superficial longitudinal ridge near
the convex and outer edge marking the attachment of
the scalenus medius muscle. The head of this rib presents a single articular facet, being usually supported
on the body of the first dorsal vertebra only. The
tuberosity is strong and well marked, but there is no
angle or groove on the internal (here the inférior) surface.

42. The Costal Cartilages are twenty-four in number, twelve for each side; and are well designated cartilages of prolongation. They are in the recent fresh state of a dull white colour, a homogeneous texture, compact, somewhat flexible, and highly elastic; when dried they lose more than half their bulk, twist, and become wrinkled; are very brittle, and assume a brownish amher colour, slightly transparent. We have for many years been in the habit of exhibiting these cartilages in this state, and showing the student that, by placing them for a short time in water (a day or two in winter,) they will regain all their former properties; and this may be done again and again with the same cartilage. They are intimately connected to the extremity of the rib by a union of substance (symarthroxis). The sternal connexion is as follows: The first by a synarthrosis to the manubrium of the sternum. The six following present a distinct, convex, angular, and projecting articular surface, corresponding to the cavities pointed out on the sides of the sternum. The first seven pairs of ribs are hence called sternal, or true ribs. In the remaining five pair of ribs, the cartilages do not reach the sternum; those of the eighth, ninth, and tenth pairs being united by a pretty distinct ligamentous substance to the cartilage which immediately precedes them, whilst those of the eleventh and twelfth pairs remain isolated, and float amongst the intermuseular cellular tissue.

43. The osteogeny of the ribs seems simple; in the very young focus the whole apparatus of the thorax is carri-

laginous. Ossific deposition commences early in the ribs, and the whole gradually becomes hard, apparently from one centre. At the age of eighteen, however, we still find a leadenlar epiphysis forming the evidentar surface of the head. The cartiloges are frequently partially millied, although it appears that there is no fixed period for this change; but it is evidently hartered by disease

or injury.

14. The Thorne, thus compound of an assemblage of bones and cartilages, assumes the form of a truncated cone, suspewhat flattened believe and believe, and having its base below; both sides ought perhaps to be perfectly similar, but this is in reality very rarely the ease. The slightest lateral inclimation of the spine destroys this symmetry, and in the most robust persons of both sexes the dorsal part of the spine presents a convexity more or less marked to the right side. In the situation of the eighth and minth ribs also a superficial but pretry extensivo depression occurs, particularly in females, which has led to the supposition that it was produced by the use of corsets, but we have distinctly observed this form to be congenital. The presence of the pectural extremities conceals the real form of the thorax, and in the male particularly the upper part seems actually the broadest. It has always appeared to us that it is here where the teacher is least uided by his museum in conveying to the student a proper idea of the thorax as a whole. The articulated sheletan, with the very imperfect imitations of the cartilages. convers an eromeous idea of the physiology of the region, and the form alone a correctly represented. It presents for examination an outer and an inner surface. a summit and a base. On the outer surface anteriorly we observe the sternem and sophoid earfilage, with the sterno-costal cartilages, oblique from above decenwards, more or less that in different individuals; posteriorly, the inclination is nearly vertical, and the whole aspect very irregular. The opinous proposes of the vertebrae occupy the mesial line, whilst right and left we observe the vertebral grouves-the articulations between the transverse processes and tuberoles of the ribs-a series of surfaces belonging to the ribs, and lastly, the angles

of the ribs, marked by the transverse ridges we formerly pointed out, and which in the articulated thorux form an oblique line, interrupted from one rib to another by the intercestal spaces, and having an inclination downwards and outwards. The inner surface of the thorax presents anteriorly the inner or mediactical surface of the sternous and sterno-costal cartilages, The ribs on each side, and posteriorly the bodies of the dorsal vertebra, which protending form an imperfeet partition, concave vertically, and contracting greatly the antero-posterior diameter of the cavity. The lower circumference or base of the thorax is large, especially in the transverse direction; it is deeply muched anterioriy; the xiphoid appendix occupies the centre, whilst the cartilages of the five inferior pairs of ribs form a lateral convex border; posteriorly this base also presents two small entries, caused by the prealing inclination of the ribs upon the vertebral column. The upper circumference or summit is small, transsersely oval, and ublique in a direction from above downwards, and from behind forwards. It is bounded by the upper port of the aternum, the first cib right and left, and the vertebral column. The axis of the therax is oblique from above downwards, in consequence of the nearly vertical direction of the spine, and the very oblique direction of the sternam; hence a line passed perpendicularly from the base will full upon the upper part of the sternum, and very much anterior to the truncated apax of the come.

THE READ.

45. The Hend is a spheroid, and is placed at the apper extremity of the trunk. Like the pelvis, it is welly an appendage of the trunk, and has been lately demonstrated to be constructed from the elements of several vertelors highly developed. The kend, without the lower jaw, when placed on a horizontal plane, rests upon the incisor teeth and occipital condylos, which are so disposed as to be apposite the middle of a line drawn from the incisor-teeth to the most prominent point of the scriput. The senter of gravity of the head is in the middle of this line, and thus we see why the head, notwithstanding its great weight is so saily supported on the spine. The head will be found, by a reference to our table, (18,) to comprehend the cranium and face. The anterior region of the cranium is named the forehead, or syncipal; the posterior, the occipal; the upper part, the top or broma; the lateral parts, the temples; and the lower region, the base. Of the bones which compose the cranium, four are single (azygos) bones, and two in pairs, making eight principal bones. The ossa wormians are sariable in number, or even sometimes not present; the bones of the internal ear form a part of the organ of hearing, and are enclosed in the

interior of the temporal bone,

46. The Occipital Boxe is of a rhomboidal form, and curved upon itself, situated at the posterior, middle and inferior part of the cranium; it presents a convex and a concave surface, an extensive irregular serrated edge, and is perforated by a large foramen, (the foramen magnum, The Great Occipital Hole.) Viewed externally, we observe that it is generally convex. The forumen magnom, dividing it into two parts; the smallest portion, (pluryugeal aspect) is nearly horizontal, having rather a rough surface full of minute foramina for the passage of vessels, and mestally a projection, (spina pharyages) this portion is named the Batilar surface. On either side of the foramen there are two convex articular eminences; they are of an oval form, elongated from behind forwards, and incline from without inwards, limited, externally, by rough surfaces into which are inserted the recti capitis laterales muscles behind, and in front by the condyloid fosse, which fosse are themselves perforated by the foramina condyloidea. anteriors and posteriora; proceeding from the posterior margin of the occipital foramen, we have an extensive surface (spinal aspect), meshally a more or less distinetly marked ridge, (the external occipital erval) runs for the extent of rather more than an much and a half, and is terminated by an eminence (the external occipital protuberouse): a smooth convex surface surmounts this probbecauce running from the protuberance right. and left, are curved lines, (the superior exceed lines of the occipital lowe.) and about half an inch below these, two other lines (the inferior curved lines.) These lines and the surfaces between them, are all secupied by the attachment of powerful unusales.

47. Viewed intermelly, the secipital bone is concave. We observe first, the internal prider of the accipital foramen, from which a broad groove called Bazilar, runs along the bazilar portion of the home; while from the posterior and lateral margin of the foramen arisos a great. (the internal occipital exact,) unresponding in usions to the external crest, and surmounted by an eminence. (The internal incipital protoherquie) from this protuberance there rans a pretty sharp ridge as far as the superior extremity of the bone, having a channel (seless auxilianus) generally on the right side. From the protuberance right and left, there occurs a more or less distinet transverse channel (sale) Interales dexter et sinister.) These lateral sules run between two pretty deep forsie (the superhir and inferior occupital fives,) The superior fosse ladge a part of the posterior lobes of the brain, and are distinctly marked with mammillary eminences and digital impressions, whilst the inferior fossawhich correspond to the cerebellum, present marks of a more superficial character. On each ode the foramen magnum, and near the root of the bazilar portion are placed, the internal griftees of the amerior contyloid forantina, partly surmounted by an eminence, external to which is a portion of a coool which lodges the end of the lateral simuses, and generally contains the internal orifices of the powerfor conduloid foramina. The occipital bone being symmetrical, the description of half its circumference will suffice. Mexially, the extrendly of the bazilar portion of the bone present a rough square surface, generally broken in separating the sphenoid bone from it. An intervening eartifuge is found here previous to pulserty, but about this period the connexion because storous, and many anntomists have consequently very properly proposed us view these bones as one, for if the rough square surface of which we now speak, he entire and covered with cartilage, then the sphenoid will not be completely formed. Proceeding from this surface to the right or left, we observe an charganal rough vascular looking surface, which is followed by a deep notels whose surface is smooth; this notely terminates the imperfect ca-

nal, (the termination of the lateral sinuses) alluded to in our view of the inner aspect of the bane. It forms a part of the jugular fossa, and jume-distely behind it we observe a square eminence (the Jugular process.) covered with cartilage in the recent state. A deeply serrated edge of about four and a half inches in extent follows, and meets a similar edge from the apposite side. at the superior part of the bonc, forming sometimes an acute angle, at other times instead of an angle we have a notels, and in this case the most uniform of the Ossa Wormiana must have been present; this supernumerary bone has received a pseuliar share of attention from the comparative anatomist. It is often named the epactal bone, and the cranium of the lower animals generally presents an additional bone in this situation, named anterior occipital, or inter parietal. It is supposed that the epactal bone in man is a rudimentary structure in him-The occipital home is perforated by five short exnals, whose orifices are named foramina, these are the magnum, and the two anterior and posterior condyloid. Its processes are seven in number, viz. two condyles, two jugular, two tuberosities, and a baxilar. Its onteogeny is curious and very complex. At and for some years after birth, simple uncertion in water will sepurate the bone into four portions ;- the bazilar, which it will be particularly remarked, supports a small portion of the condyles with about a fifth of the margin of the foramen magnum; two portions, including the remainder of the condyles, and about three-fifths of the circumference of the foramen magnum; lastly, a large squamous portion, supporting somewhat less than a fifth of the foramen magnum. At an early period of the fortal existence, each of these portions are observed to be developed from several centres. The foramen magnum is evidently analogous to the great vertebral foramen observed in all the vertebrae. The condyles seem to be analogous to the superior and inferior articular processes of two vertebras; the squamous broad spinal portion is evidently highly developed lamine and spinous processes, whilst the buzilar in its intimate structure, form, and made of connection with the splannoid, presents all the characters of the body of a vertebra-

48. The articulations of the precipital bone are the

sphennidal, temporal porietal, anterior occipito-atlantal,

posterior occipito-atlantal.

49. The Sphereoid Boss has been supposed in recemble a but, thus giving rise to the absured names of wings to some of the process. It is a single symmetrical lame, and is placed in the middle part of the lame of the cranium. We shall view the bone in the following order,—viz., Occipital or post rior aspect; a Corelaral or upper aspect; an Orbito-massler moterior aspect; a

Gutteral or inferior aspect.

50. Thraceipilal aspect of the spheroid presents medially a quadrilateral rough surface. (anhew-overfille) suture) the counterpart of that pointed out on the fazilar process of the occipital. They are consected to each other, in most cases, by an intervening cartilago, up to the age of 15 or 16, and maceration in water will destroy the medium of connexion and insulate the bones, although the union is so poculiar, that they would not separate in the fresh state without considerable violence and probable destruction of one or other of the osseous surfaces. After this period of life, the sphenoid and occipital rapidly form an osseous union, and the intervening cartilage disappears. Passing to the right or loft, the surface is irregular, perforated with numerous holes, all of which, however, lead to the lody of the hone, but about an eighth of an inch from the sphem-accipital surface, the posterior prifice of the vidian canal presents itself. This opening is flanked by a small eminence, which produces an irregular narrow genove, leading from the viding towards the usual line and gutteral aspect into a deeper groove, sometime's a canal called the previous policine canal, outside the vidian foramen. There are some asperities, which, fitting but imperfectly the auterior edge of the fibrous portion of the temporal bone, give rise in the fully uncerated experient to an opening in its base, called the foramen Incerne medians, and at the extreme limit of the aspect, we observe a sharp angular point, the spine.

51. The cerebral aspect of the aphrenial presents mortally proceeding from boliod forwards, a flat surface continuing the busilest grows, runs forward and torminates in two lateral processes, comowhat vari-

able in form, and named the posterior climid procerns. The processes, and the intervening lamius of home, are observed to be raised considerably, and to project over a deep depression of a square form, performed with a number of minute holes. The depression is named the sella Turcica, from its being supposed to resemble a Turkish saddle, or better, miniture fines, as a body named pituitary lies in it. Auterior to the pituitary fassa, the Olinary proness, sometimes named middle olynoid, which again is sucenoded by a superficial transverse groove, (uptic zulci) ladging the commissure of the optic nerves; these optic coler curving slightly forwards, lead directly into the optic annals; lastly, we find a very superficial ridge, flanked by amouth slightly depressed surfaces, (offictory depressions;) laterally the bone is concave, lodging a large portion of the middle lobes of the brain, and presenting several mammillary eminences and disgital depressions. More minutely examined, and procooding from behind forwards, we observe the following parts:- The favores spinoress: on opening about the size of a crow-quill, giving passage to the middle meningeal artery. The foreven neale giving passage to the third branch of the fifth pair of nerves. The foromen ridundam giving exit to the second branch of the lifth pair of nerves, externally to which there is a large concave surface, and on the inner side a broad groove which bulges the cavernous sinus, the internal caratid arrary, with the third, fourth, first division of the fifth and sixth pairs of nerves, most of which enter the orbit by an extensive finsure, (sphenoidal (launt,) whose boundaries will be more particularly described in speaking of the orbito-mont aspect. Proceeding forward, we observe the transverse orbitar procome or small wings of Ingrassias, a triangular depresent transverse emissence of considerable extent. smooth above where it corresponds to the anterior lakes of the brain, and forming part of the orbits below, and presenting posteriorly a warrow but amount edge which pomotrates into the flavore of Sylvins, a figure of the brain; externally a pointed and free ages, internally and towards the mesial line it forms a thick toberele (anterior elyucid processes,) fire sting over the envernous grooves, and whose base in traversed by the optic canals. The cerebral spectis terminated anteriority by an irregular, serrated, and narrow edge, (the frantal edge) and thus leads us to the examination of the

52. Orbito-sasal, or anterior aspect of the spheonid. A vertical and slarp ridge, (whamidal ridge) surmountted by a minute but distinct that quadrilateral articular. surface, intersects this aspect mesually,-or village sale of this ridge, there is an aperture (foramism Berlinu) leading to cavities formed in the interior of the adult sphenoid, named the sphemidal sinner; those opertures will be large or small according to the more or less perfect state of two triangular bones, described by Bertin, and named after him, the turbinated banes of Bertin. They are separate only in the young sphenoid, and ought not, therefore, to have been described as separate bones; they are of extreme delicacy, and often, as we think, imperfectly developed, giving rise to the supposition that they have been broken, and exposing to a great extent the sphenoidal saauses, which it is singular and interesting to remark, do not exist in young persons. External in the openings of the sinuses, irregular surfaces indicate the lateral articulations with the sides of the ethnoral tune, and also with the palate bones inferintly. Passing over the sphenoidal fissure, of which we shall presently speak, there occurs on each side an irregular quadritateral surface, spheno-orbitar plate or process,-it is smooth and plain, and forms the outer wall of the orbit, and is bounded inferiorly by a horizontal free blant ridge. (sphero maxillary ridge) which forms the upper boundary of the spheno-maxillary fissure; internally, by a rounded edge, which belongs to the forgons laveran anterits or spenoidal figure; a notch, or sometimes a hole, is observed at the upper part of this edge, for the pussage of a branch of the opisthalmic artery | and externally by a rough indented margin (malar); articulating with the malar bone. The anterior orifice of the formmen retundent is seen beneath this surface, and still lower down from its inclination the unterior orifice of the vidian canal, which, however, may be more correctly described as being found on the

53. Getternt or officion aspect of the sphenoid. Mesially we observe pronteding from before backwards, a ridge. (the rostrumor anygons process), continuous abuve with the septem of the subeneedal sinuses, and received into the upper grooved edge of the vomer. On each side, proceeding from within outwards, a groove, which receives aplate of the vomer, and more externally another groove. which, when the palate bone is in airs, contributes to form the plerygo-pelatine canal; a canal which commences in a minute groove on the accipital espect of the bone, close to the posterior opening of the vidian canal, and to which we have already alluded, the more particularly as we have found good anatomists at a low to point out this canal. The pterygoid processes are irregular projections, directed vertically downwards; internally, these pterygoid processes present a straight and smooth surface, lined by the pituitary membrane. and forming the lateral walls posteriorly of the aperture of the usual fosses. It here presents a pretty sharp ridge bifurcated inferiorly with rough edges, articulating with the pulate bones, whilst at its root or base we observe a smooth triangular surface, which looks into the avgomatic fossa. The pterygoid process externally presents a broad surface, to which the external pterygold muscle is attached, whilst posteriorly the process is deeply hollowed by the ptergood forme, into which is inserted the internal pterygoid mosels, and which in this direction divides the process into two lamine; the internal of these gives attachment to the superior constrictor muscles of the pharynx, and near the root, by the scanboid depression to the external peristaphylin, or circumflex muscle of the palate. The base of this process is traversed by the videau canal, whilst into the bifurcation below is received the tuberceity of the palatebones; and on the inner branch of this bifurcation is the humular process, over which plays the tendon of the external peristophylin, or circumfler musels of the palate, whose attachment we have pointed out in the scopboid depression. On the outer and buck part of the pterygoid processes no observe the external arifice of the formsion evalla and the foraming spiness, placed at the root of a sharp leregular spine; whilst towards the sides, the bone, branching out extensively,

presents, first an oblique concave surface, which belongs to the aygomatic fosse; a transverse ridge separates this surface from a more extensive slightly concave quadrilateral surface, (temporal processes, or greater wings), forming a large portion of the temporal fossus. The sphenoid bone is articulated to all the bones of the cranium, and the various articulations form the division between the four different aspects which we have endeavoured to describe. The appenoid is also articulated with some of the bones of the face, viz. both malar bones, the two palate, in many cases with the two superior maxillary, and always with the vomer. The processes mentioned are fourteen in number, viz. two spinous processes, two posterior clinoid, one olivary, two naterior clinoid, two transverse orbitar, two spheno-orbitar, one ozygous, two pterygoid, two hamular-The foramina are six in number, -two spinous, two ovul, two round, two leading to the sphenoidal sinuses. The eanals are six in number, (presenting, of course, two foramen each), via two videau, two pterygo-pulatine, two optic. The sinuses are two, sphenoidal. The fissures are two, sphenoidal.

54. In the child, maceration will separate the sphenoid hone into three portions, one including the body and the wings of Ingensias: two composed each of the two greater wings and pterygoid processes. By examining the growth of the bone in different factures, at different ages, we observe that the bone hardens from at least series centres of ossification. The state of ossification is particularly interesting about the seventh or eighth month, when the bone will be found to present the appearance of being divided into an auterior portion, or sphene-orbital, and a posterior, or sphene-temporal portion, a division which holds good in most of the lower animals long after birth, and in some throughout life, and constituting what are now called by comparative anatomists an an-

terior and posterior sphenoid.

55. The Etheroid Bose (sieve-like bone) is single and symmetrical, placed in the mental plane in the base of the cranium immediately auterior to the spheroid, and posterior to the frontal bone, into a much of which, a large portion of the etheroid is received. Its form is

mearly cubical, compassed almost entirely of this lamino, natremely fragile, though hard. The lamine are placed in a variety of ways, forming many collabes, all of which are limit by a continuation of the pituitary municans, communicating with the nustrils on the one. hand, and with the aphaemidal cells, by the apertura Bertini or ocalus Morgaga), on the other. The fully insperated bone is extremely light, and as we have remarked, so fragile, as an give way under the most deliento weath, so that the student seldom has the satisfaction of having an ethanoid in his hand. We are artisfied, indeed, that many a surgeon has passed the public lauards without having over touched the othonid home. One part is of extreme density, viz. the crista gull; and as the loose is really a very important one, we recommend the student to follow our plan. We drill a small hele through the crista galli, and twist a portion of brass wire illrough it, of sufficient strength to support the hone. We have by this recass had the same othmold in frequent use for four or five years, and it is still entire! The spheasidal or posterior aspect presunts, in the middle, the perpendicular plate, extremely thin and retiring in this aspect; superiorly, upon a very reduced scale, a surface precisely similar to those by which the sphenoid and occipital were connected to each other, the continuation, in fact, of the system of the bodies of the vertebrae. A corresponding surface surmounts the ethnoidal ridge (S2) of the sphenoid; an intervening cardilage existed in the young person. The perpendicular plate further meets the sphenoidal ridge, and lastly acticulates with the vomer, and thus forms part of the septum marium. A deep narrow growe, the ethinoid groove, separates the perpendicular plate on each side from a more or less convex and very irregular surface, the ethinoid mills, being left upon by the removal of the sphenoid above, the painte below, and the turbinated bones of Bertin (52) in the middle. Misially, and looking towards the vertical plane, these irregular sorfaces present various intoroxing objects for examination; superiorly, there is the superior inchimated bone (concha superior), a small thin place bent on their from above downwards; he-

neath it a horizontal channel, the argeries means of the must forme. This channel runs forward only a store way, and presents an aperture which heads into the posterior ethnoid cells, which, however, cannot be soon unless a section of the hone is made; it is thus that the sphenoidal cells communicate with the posterior willmoidal; below this channel we observe the middle turhimsted bone (enneha medio), larger in its dimensions, but very similar to the superior turbinates. This middie turbinated bone forms in a great measure another channel, the widdle weaths, which at its anterior extramity presents a second aperture, leading to the anterior ethmoidal cells; these have no direct communication with the posterior otheroidal or sphemoidal cells, whilst one of them, named or indibulum, situated behind the other, and representing a sort of flexuous canal, directed forwards and upwards, communicates with the frental

56. The narel or inferior aspect of the ethinoid presents a werlical plate, having a longitudinal direction and a blunt edge, which is articulated with the opper margin of the vomer and the triangular eartilage of the nese. On each side of the perpendicular lamina runs a deep narrow groove, leading to the interior surface of the cribriform place, and consequently beneath the officiary canals, The upper half of the vertical plate will be observed, by a enreful inspection, to be traversed by the internal offactory canals; outside the grooves are the inferior horizontal free surfaces of the middle turburated bones; then the middle mentur; and, lastly, several thin fragile. lamines, which articulate with or line the inner wall of the superior nauxillary bone, and circumscribe the openings of the maxillary sinus. The maso-maxillary or anterior aspect, presents, mesially, the anterior margin of the perpendicular plate; laterally, the auterior extremities of the ethnicid greeness external to these. an irregular asseous surface the anterior chanoidal cells, imperfect in consequence of the removal of the frontal and superior maxillary hones, which are here required to complete them. It will be observed that the vertical plate becomes thicker as it ascends towards the cribriform plate.

57. The cerebrator posterior espect of the ethanoid presents the remarkable drilled appearance which has given the bone its name. Mexically, the crista galli ferlimoid crest) rises vertically in a graduated manner, having the form of a triangular pyramid; its anterior edge is short and nearly sertical, and is supported, as it were, on two small depressed eminences, which articulate with the frontal bone, and contribute to form the favoures excum-On either side is a channel folloctory channel), perforated in its whole extent, but especially anteriorly, by round irregularly distributed holes, massed the offertory foramina. These foramina are of two kinds; some large and distinct, situated close to the base of the crista galli, to the number of ten or twelve; the others are small, and occupy the middle space. The large foragina are in fact the superior orifices of short eanals, which subdivide in their descent in the interior of the bone, and are continuous with those pointed out on each side of the upper ball of the vertical plate. At the very base of the erista galli, and quite at the anterior extremity of the olfactory channels, which are here deep, is a small longitudinal fissure, which is traversed by the internal branch of the masal nerve; more external to the olfactory channels, the surface being slightly elevated, is flattened superficially; it sometimes presents the appearance of an extremely delicate net-work, as is the case with the bone now before as; in others we observe half collules. An extensive ceilule is always observed autoricely, which mosts the frontal sinuses. These horizontal flattened surfaces are indeed completely concealed by the frontal hone when in new, and two transverse grooves, dividing the space on each side into nearly three equal parts, are then converted into ensals, the external orifices of which have received the name of internal orbital holes, (foramina orbitaria interna) -they might be called the ethnoide-frontal canals. This aspect is terminated posteriorly and mesially by a pretty deep notch, in which we find that harizontally flattened surface forming the most intimate union with the sphenoid, and with which we commenced one description of the bone. We have still right and left, two orbital or lateral aspects. These are quadrilateral, plain in the greater part of their extent, but ent obliquely at their auterior and posterior extremities. The surface has received the name of the or planum, and forms a large portion of the inner wall of the orbits.

58. The sthmoid cannot be well understood without using a section, where the vertical plate has been left ontire on one side, and entirely removed from the other, thus expussing at once the mentuses, and that surface of the vertical plate, not well seen when the hone is entire. Its development as a bone is very slow. The turbinated bones are not osseous until about seven years of age, nor are the cells present, the centre of the bane being till that age solid; it may be said to ossly from three centres, one for its middle part, and two for the lateral region; but we are of opinion that many more elementary centres of ossification onter into its composition. Its articulations are with the sphenoidal, fromtal, ansal, superior maxillary, lagrymal, lower turbinated, vamer. It is rather a curious fact that it affords attachment to no museles, although it is possible that occasionally a small part of the tensor tarsi might be found to touch the suterior edge of the orbitar process,

59. The Frontal Base is symmetrical, of a more than semi-circular form, convex and smooth anterorly, concave posteriorly, and unequal below. It is divided

into the following parts:

60. Orbito-ethmoidal or inferior aspect of the frontal This aspect presents in the middle the ethanul might. Around this notch, there are observed, anteriorly the seasof spine and the orifices of the frontal sinuses; on the sides, portions of cellules, which unite with similar purtions belonging to the ethmoid hone; and small transverse grooves formed between these cellules, which contribute to form the internal orbitar canals. On each side of the ethmoidal noteh, there is a trungular concave surface, which forms the vault of the orbit (orbitar procours), presenting anteriorly and to the outside, a small cavity (forsa lachrymalis) which receives the lachrymal gland : in the same direction, and to the merity, a slight inequality to which is attached, in the recent mileject a cartiloginous pulley, through which the tendon of the superior oblique mounts of the eye is reflected.

61. The frantal, anterior, or paricronial aspect of the frontal bone is marked in the middle with a longitudinal line, commonly not very distinct, occupying the place where the two portions, of which the home computed at an early age, are united; before this union a suture is always observed. At the lower part of this line is the minil providerance in old persons, perforated by a nameher of small holes. Farther down there is seen that moral motels, which is articulated with the nasal hones in the middle, and on the sides with the nasal processes. of the superior maxillary bones. This notch itself surmounts the word agine; on the sides of which are two small longitudinal grooves, forming part of the root of the nasal fosce. The nasal spine is articulated anteriarly to the rosal hones, and behind to the vertical plate of the ethmold bone. On either side, and proereding from above downwards, there are: a broad and smooth surface, povered by the frontalis muscle; the frantal presuberance, which is very distinct in childron; a slight depression; a transverse eminence, slightly corved, more prominent internally than outwards, named the superciliary arch, from its corresponding to the eye-brow, and giving attachment to its musche; another prominent line, also curved, which proceeds from both sides of the basal grouve, and is named the orbital arch or margin. It is terminated by two processes, the outer of which, thick and prominent, mins the malar bone; while the inner, which is thin and broad, is articulated with the lachrymal bone; these processes are called the external and internal orbitar or augular processes. At the inner third of this arel, there is observed a hule, or a noten converted into a hole by a ligament, the supra-orbital forumen. and which gives passage to the frontal vessels and nerves. Above the external orbitar process, there is a curved prominent line, running in a direction upwords and backwards. It forms the limit of a small deprenand surface, part of the temporal lossa, and gives attachment to the temporal muscle. The exchral, posterior, or internal aspect is concave, in contact with the dura maner, and presenting in the middle a groove (solons longitudinalis) in which is lodged the communicatement

of the superior longitudinal sinus; the margins of this grouve unite below, forming a ridge to which the summit of the fals is in part attached, and which terminates at a hole railed the forantea executs. This surface of the bone also presents on each side a great number of inequalities, corresponding generally to the convolutions of the brain, named mostillary emissences and digital supremiour. There are also observed upon it several arterial furrows, and the frontal fosse, which correspond to the protuberances of the same name. The Upper margin is thick, uneven, more than semicircular, cut obliquely at the expense of its inner plate above, and of the outer below. It is articulated with the parietal bones in such a manner, that, with the aid of this obliquity of its edge, it rests upon them above, and supports them below. It terminates on each side by a broad rough triangular surface, which joins the great wings of the sphenoid bone. The Lower ourgrais straight, thin, interrupted in its middle part by the ethmoidal notch, and cut obliquely so as to sustain the transverse orbitar processes (wings of Ingrassias) of the sphenoid bone. The frontal bone is thick towards the nusal protuberance and the external orbital processer, but very thin and even transparent in its orbital region. It is formed of diplas contained between two compact lamina, and presents in its substance two cavities, the frontal sinusce. These sinuses vary in size in different subjects, and are rarely absent : they have their orifice anterior to the othogoidal notch, and from thence extend into the frontal region of the bane, sometimes even as far as the external orbital processes-They are generally separated from each other by a septum. They communicate with the anterior cellules of the ethonoid home. They are developed as the person advances to maturity. The frontal home is articulated with the following bones-parcetal, sphenoid, ethmoid, nasal, upper maxillary, factorymal, and the malar bours. Its development takes place by two points of ossification, which begin, about the forty-secord day of gratation, to make their appearance on the frontal protuberances, or rather in the orbital arches, and from thence send out radii towards the circumference of the bone. The suture (setters frontalis) by

which the two lateral halves are at first united, generally disappears a few years after birth, although not

at any very regular period.

62. The Parietal Bones are of an irrogularly quadritateral form, coneave internally, convex externally, and occurry the lateral, upper, and middle parts of the They each present the following parts:-An outer supert, convex, susuath, and covered by the epierunial apotemrosis in its upper half, somewhat uneven in its lower half, where the temporal muscle is inserted, and where there are sometimes observed slight ferrows for the deep temporal arteries. This surface is perforated, above and behind, by the purisful formuce, when present it gives passage to small vessels which establish a communication between those of the dura mater and perferantum. In the middle of this rapper there is observed an eminence, prominent in children, named the purietal protuberance; it surmounts a corved line, which is continuous with the ridge observed on the frantal bone and with the upper root of the sygomatic process, giving attachment to the temporal apuncarosis. The inner presedent aspect is concave, covered by the dura mater, and marked over its whole extent with deep furrows, which ladge the divisions of the middle meningeal artery. It presents cerebral impressions, but they are indistinct, sopecially above. In the middle is a depression called the periotal forse, corresponding to the protuberance. At the upper part, near the edge of the hone, there is observed a half groove running in a longitudinal direction, which, united to a similar half groove in the other parietal hane, is continued into the groove on the inner sarface of the frontal bone. Near this, there are observed small irregular cavities, varying much in number and arrangement, which receive the bodies called olumbs of Pocchions. The hone presents four edges. The upper or sequital is the longest; it is straight and denticulated, and joins that of the opposite bone, with which it forms the sagittal suture. The lower or tongwood edge is the shortest; it is cancave, and surmounted externally by an oblique surface, marked with prominent radiating stree, which is concerned with the upper edge of the temporal bone, forming the equamous suture. The

onderior or euronal edge is denticulated, and is our obliquely at the expense of its inner table, except to a small extent superiarly, where it is at the expense of the outer; it joins the frontal bone. The angle which it forms above with the upper edge is transated in children, and substituted by a membranous part holonging to what is named the upper findamelle. The angle formed below by its junction with the lower edge is prolonged downwards and forwards, obliquely curroil at its summit, and articulated with the sphenoid bone; at its internal part, it presents a deep groove or canal, which lodges the middle meningeal artery. The posterior or occipital edge is very unequal; its indentations are irregularly disposed, and retain among them many of the small hones called ossa Wormii; it is articulated with the upper edge of the occipital bone. The angle which it forms below with the lower edge is truncated, and articulated to the masteid portion of the temporal bono; the angle which it forms with the upper edge is the most obtuse. Internally the angulas mastnideus is hallowed by a portion of a canal which is continuous with that existing on the occipital and temporal linner, for the lodgment of the lateral sinus of the dura mater. The purietal bone is in general thin, although somewhat thicker at its upper and back parts, and consists of diplos contained between two compact plates. It is developed by a single point of ossification, which makes its appearance at the parietal protuberance, over a pretty wide extent, and under un areolar form. The parietal bone is articulated to that of the opposite side, and to the frontal, neripital, tempural, and sphenoid bones.

63. The Ossa Worminus are extremely variable as to size, situation, form, number, and other circumstances. In the suture between the occipital and parietal bones they are most commonly mer with; and perhaps that one found at the apper angle of the rempital bone deserves most attention. The analogy in the skeleton of all mammiferous animals strikes even the non-professional with surprase. The comparative anatomist often speaks of an inter parietal bone, or an anterior occipital. We see the radiaments of this in the small irregularly developed bone now alladed to.

54. The Temporal House (aver temporara) contain in their interior the organs of locaring, and occupy the lateral and inferior parts of the graditum. They are come annuly divided into three portions, vir. the agareness, the mushind, and the prirmer. They present no onviender or external aspect, slightly convey, amonth, and entirely situated at the outside of the oranium, anterior and upper part is fernal, marked by several graceves in which branches of the deep temperal artisries are lodged; it gives attachment, nearly over its whole extent, to the temporal months, and forms part of the temporal form. A strong avgoinatic process, broad at its commencement, but gradually becoming unrower; and twisted open itself as it removes from the rest of the box. The upper odge is thin and straight, and gives attachment in the temporal aponeurosie; the lower rolge is thick, concave, and serves for the insertion of the masseter mosole, its outer surface is convex, and lies immediately under the sking its extrendly is out abliquely downwards and backwards, and is denticulated for its articulation with the under bone. Its base, is turned landwards; and hollowed almore by a superfleial groove in which a great part of the fibres of the temporal muscle slide, gives rise to two prolongations named Room. One is inferior, transverse, concave from within autwords, and convex from before backwards, and articulates with the lawer farewhere this root joins with the base of the process, thereis a rough surface, to which the external belowd ligament of this articulation is attached; the other, which is superior and longitudinal, is decented backwards, and divides into two. Its upper subdivision, by describing a corre, gains the circumference of the hone; the lower descends a little inwards, and terminates at the outer extremity of a very narrow fewere which opens into the cavity of the tympunum (Sciences Glaseri); through this fisture there pass, the tenden of the external muscle of the mallens, some vessels, and a nervy called Cords Tumpant. The anterior segment of this fissure, whose direction is inwards and a little downwards, is covered with cartilage in the recent state, and is articulated with the condyle of the interior maxillary bone; the posterior argument is covered with periorteum, and days

mot form part of the joint. Rehind and to the outside. of the glonoid envity, between the two divisions of the upper mot of the process, is the writtee of the sourceaf unditory canal (means unditaring everants.) This canal seems formed of an comous plate rolled upon itself, blending above with the rost of the boso, and turning below an unequal rugged edge, more or less prominent. which gives attachment to the carrilage of the ear. The ganal has a direction from behind forwards, and from without awards, is a little curved downwards, and narrower in the middle than at either extremity. Boyond the means ambitorius there is observed a quoical eminence, named the Martard Process, giving attachment to the surup-most odens, and is surmounted by a rough surface, but which that muscle is inserted, together with the splenius and trackelo-mustoideus. The Farmers Manualerus commonly occurs here, although it varies much in its position, being sometimes met with in the occipital bose, and not unfrequently in the suture by which that bone is joined to the temporal. On the beside of, and behind, the mastoid proress; is a longitudinal depression named the Digartric Groove, and farther back mother groove, less deep, in which runs the occipital artery. The Cerebral or Internal Aquet presents at its upper part an articular surface cut obliquely, and deeply stylated, connecting the house edge of the parietal, is nowle browler in its middle part than behind, and aspecially than before, where it runs into the circumference of the bone. I'mder it, there is observed a concave mayora space, marked with several actional forcows, and nerebral impresaluns. A pyramblal, triangular process, Petrons Princes (pure percont), having its annual directed forwards and inwards, rises from the middle of the aspect. and as it includes the special some of hearing, requires and deserves a minute description, we abserve on it: 1. An upper and universe surface, which presents in its middle a small bregular sporture, named Histor Fallspii through which a norvous filament from the spheno-palatine ganglion, and a small artery, are transmitted to the aquaduct of Fallopius. Anteriorly to this hole, there is observed a small single or double groove, which is straight and shallow, and ludges the

nerve and artery just mentioned; behind it, is a prominence, which indicates the position of the superior semicircular canal. 2% A posterior surface, covered like the proveding, by the dura mater, on which there is seen, at its oppor and fore part the internal auditory. (mealus anditorius internes,) a wide and oblique aperture, with rounded edges; this lends to a short canal, whose direction is forwards and outwards, and is abruptly terminated by a vertical bony plate, in the upper part of which there is a small opening, leading into the aqueduct of Fallopius, for the passage of the facial nerve; beneath this opening is a crest, surmounting a number of pores, through which pass the filaments of the portio mollis to the labyrinth. Behind the aperture of the meatus auditorius internis, there is observed an irregular cavity, into which is fixed a prolongation of the dura mater; behind this there is a narrow, triangular, and very short slit, in which the aqueduct of the vestibule (aquadactus acstibuli) terminates; a pretty distinct groove descends from this slit toward the jugular fossa. This surface is separated from the upper part by a blunt edge, presenting internally a semilesar depression, on which rests the trifacial nerve, and marked in its whole length with a superficial channel, in which is lodged the superior petrocal sines of the dam mater. 30, A very complex inferior surface, placed on the outside of the cranium; internally, it presents a very rough space, into which are inserted the fibres of the levator painti and tensor sympani muscles, and which is bounded externally by the orifice of the carolid cases, and by a cavity which opens behind it ; this cavity, is named the jugular force, and lodges the commencement of the jugular vein, it is limited posteriorly by a small quadrilateral surface, tipped with cartilage in the recent state for its articulation with the ingular process of the occipital hope; between this facet and mustoid process, there is a hole, mamed stylemusical floramen stolo-martoideum J, which terminates the Fellopian aquatect, and transmits the facial nervefrom the interior of the cranium. Auterior and internal to this aperture, there is observed the studied procets, its base is embraced by a buny lamina, called the raginal process, which forms the posterior limit of the

plound eavity. Upon the crest dividing the jugular form from the inferior opening of the earotid canal, is an opening leading opwards and bookwards; This is the commencement of the canal of Jacobson. A branch of the glosse-pharyngoal nerve passes into it. The canal culalivales ultimately into three branches ;-beading, Lst. To the grouve for the vidion; 2d, The grouve running parallel with it; and 5d, To the carotid canal. This surface is supurated from the upper surface by a very short edge, which is articulated with the sphenoid bone, and is not very distinct on account of its irregularity; from the posterior, by an unequal edge, in which there is posteriorly a notch, frequently divided into two partisms by a small bany plate, concurring with the orcipital hone to form the foramen lacerum posterius. At the middle of this edge is a triangular aperture, which is the external opening of the aqueduct of the cochlon. The summit of the petrous process is very uneven, ulaliquely truncated, a portion of the circumforence of the foramen lacerum medium belongs to it; it presents the internal orifice of the carotid canal, (constar variations). The Aqueduct of Fallapius, whose commencement we have already pointed out in the bottom of the internal auditory canal, and which we have seen terminating in the stylo-mastoid forumon, is a narrow canal, remarkable for its length, which transmits the portio dura of the seventh pair of nerves. Immediately after its communerment, it ascends outwards and backwards, to the upper part of the petrous process, where it is perforated by the limitus Fallophi ; it then proceeds directly backward over the excity of the sympanum, and descends first obliquely, then vertiently, in the inner wall of that envity, to end in the style-masteid hole; this canal is lined by a very thin fibrous prolongation, and is perforated in its passage by several apertures, independently of that of the hiatos Fallopii, the principal of which is a canal which transmits the cords tympani; there are also some small cannils for nervous filaments which are distributed to the muscles of the small bones of the car. Belind the petrous process, and on the cerebral aspect of the mastold portion of the temporal home, there is a deep channel which presents the internal orifies of the masteid hole, and lodges a portion of the lateral sinus of the dura moter. The circumference of the bone is mustly articular. It commences by a restring angle, at the place where the anterior edge of the petrous process unites with the rest of the home. This mogle, which receives the spine of the spheroid bone, presents at its bottom two apertures, separated by a bony lamina, and placed one above the other. The uppur, which is less marked, gives entrance to the inner muscle of the malleus; the lower is the ordine of the long portion of the Esstachian Twhe. The direumference is now cut obliquely at the expense of its outer surface, and becomes thick and denticulated to be joined with the sphenoid bone, directing itself forwards and opwards. It then becomes thin and sharp, and proceeds backwards, describing a semicircle; here it is articulated with the parietal bone, forming what is called the Squamous Safare. Above the mastoid process it is again murked with a retiring sugle, becomes thickened, and unites with the inferior and posterior angle of the paristal bone. Lastly, it descends forward, still tlack and denticulated beneath the mustoid process, and forminates at the petrous portion near the stylo-masteid bole. This part of the circumference is articulated with the upper partion of the lower edge of the accipital home. The petrous process is formed of a very dense and white commet tissue; next to the tooth, it is the hardest part of the skeleton; and from this circumstance it has derived its name. The mustoid process is filled with large cells of two kinds, viz. The medullary cells found in all bones and cellules lined with a mucous membrane martinuous with that lining the tympumum, the Eustachian canal, and mouth. The temporal bone is articulated to the sphenoid, occipital and parietal bones, the malar bone, the lower jaw, and livoid bones. Its development takes place by six points of ossification, one for the petrous process, one for the circumference of the external auditory canal, one for the squamons portion, one for the masteid process, one for the aygomatic, and one for the styloid process. The fourth and with make their appearance long after the rest. In certain cases, there are two ossoons nuclei for the squamous portion.

65. In the interior of the petrous process of the tempocal busins, we find the apparatus constituting the organ. of bearing ; various sections are made in order to display this very complex structure. The dissection on the fresh subject requires a very favourable one, i.e. young and free from fat, instruments which are not generally in a directing case, are required to break up the lune. Perhaps the tympanum will be best seen and understood by the student, by following the Eustachian tube into its interior. A description is given in another part of the work, (Organ of Hearing),-and we shall merely here allude to the four bones found in the interior, and forming a part of the apparatus. Maceration destroys the membrane of the tympunum; and the four small hones are readily picked out from their situation.

66. The Malleus is divided into three parts, the head, work, and headle,—the head presents two slight depressions, which are articular, separated by a prominence; the neck is short, and supports, in the well prepared and complete specimen, a short process, and besides this an clongated slender process, named after the celebrated anatomist, "Raw's process;" this process lies in the glenoid fasture; gives attachment to the autorior muscle of the malleus, and is almost invariably broken in the removal of the bone from its situation. The handle of the malleus adheves to the inner surface of the membrana tympani,

67. The Junus presents a body and two branches. The body has two unequal tubercles, both articular, corresponding to those articular depressions pointed out on the head of the millions. The shortest of the two branches, which is cone-shaped, projects into the sarrance of the masteid cells. The longer and more stender branch is placed nearly parallel to the handle of the mallens, and presents at its summit a slight articular eavity, corresponding to a similar one on the

ties. On Orbiculare.—This bone does not exceed in size the head of a small pin, and in general remains attached to the larms in each a manner on to appear as if it were morely an epiphysis of that bone; it presents an articular surface, which corresponds to a similar one on the 69, 8/apex.—This have has been named from its arrong resemblance to a stirrup-iron. It presents head, two branches, and a base. The head prosents the articular depressed arriance for the play of the morbiculars. The base is a thin broad oral plate, convex on one, (the internal aspect), and concave on the external. This plate is let into the opening called the fenostra oralis, and generally so nicely fitted as to remain in its place after magnetism and water have removed the others from the tympanism; indeed, to some animals we have observed that it is larger than the hole filled up by the membrana tympani, and thus cannot be removed.

OF THE PARE.

70. By a reference to section 19, it will be absorved, that this region of the skelmon is composed of a greater number of bones, though of loss extent, than the eranium. We divide it into an upper and have range.

71. The Superior Maxillary Boxes are large, and of a very irregular form, occupy the moddle and anterior part of the upper jaw, enter into the composition of the orbit, nesal force, and mouth, give passage to various nerves and vessels, and afford insertion to numerical muscles. The puter or arbito-facial aspect, is surmounted internally by a flat obling process, called agant, which is smooth and concave from above downwards. and presents several vascular apertures. This process, which forms part of the outer wall of the mesal fasse, presents, internally, at its upper part, irregularities which are connected with the bageal mastes of the ethanoid bone, below which is a channel belonging to the middle mentus of the postrils, and farther down a horizontal crest, united to the inferior turbinated bone, also some arterial farrows. The nasal process terminates above in a truncated summit, furnished with dentiqulations, to be articulated to the most notels of the frontal bone; anteriorly, in a thin oblique edos, which rests upon the masal lones; behind, in a greave, which is broader and deeper below than above; the materiar ester of which is articulated with the inchryunal bone. and the anterior is free, and continuous with the lower

margin of the orbit. On the outer and back part of the masal process is a smooth triangular surface, inclined dawnwards, forwards, and outwards, forming part of the floor of the orbit. About its middle and back surt, it presents a channel which soon changes into a canal, named the infra-orbitar, which lodges the vessels and nerves of the same name; this canal, as it proceeds forwards and inwards, divides into two subordinate ones; the posterior of which is the smaller, and descends, under the name of the superior and autorior dewlar casul, in the anterior wall of the maxillary sinus, where it sometimes opens; it affords a passage to nerves and vessels which bear the same name. The other, or anterior division, which is wider and aborter, follows the original direction of the canal, and terminates at the infra-orbitar hole. This surface is limited: behind by a rounded edge, which concurs to form the spheno-maxillary fissure; internally, by a thin and uneven edge, which is notched before, to be articulated with the lachrymal, and behind, with the palate bones. whilst in the middle it is connected with the ethmoid : anteriorly, by a third edge, which is rounded, and of small extent; it forms part of the contour of the orbit. Between this edge and the posterior, there is a triangular and very rough eminence, named milar / proceszwa walaria), which is articulated to the cheek-bone. From the outer angle of this process, there descends vertically a blust prominent edge, sancaye from above downwards, behind which is a portion of the bone belonging to the zygomatic fossa, while before it is a protty distinct depression, called the infra-orbitar form. perforated above by the infra-orbitar foramen, which gives passage to the infra-orbitar vessels and nerves, and affording attachment below to the levator auguliuris muscle. Anteriorly, this fessa is bounded by the myriffurm form, on indistinct depression, into which is inserted the depressor of the wing of the nose. The inner or suro-palatine aspect, is concealed in the masslfosse superiorly; inferiorly, it forms part of the arch of the palate. It is divided into two portions of different extent, by a broad flat horizontal eminence, very thick before, which is named the polutine proves (processus uniatinus). The masal aspect presents at its fore-part

one of the superior apertures of the anterior palatine causal, and is concave and smooth. The inferior or bucen) aspect, is rough, uneven, and marked with a great many small apertures and aeveral furrows; the latter of which are sometimes converted posteriorly into small boay arphes, more or less complete, under which the palatine nerves and vessels pass. Posteriorly, it is bounded by a doped and denticulated margin, which austains the pulate hones; internally, it united with the opposite bone by a thick struted edge, presenting anteriorly a channel which occupies only the lower half of its thickness, and is directed obliquely downwards and forwards; by uniting with a similar claimed in the other bone, it forms the interior polatine incivity canal. This edge is also surmounted by a ridge. deflected a little outwards, more prominent before than behind, which constitutes the half of a groove, into which the vomer is received. Boneath the palatine process, there is observed a concave surface of small extent, uneven and envered with furnism. Alsove it, on the contrary, is seen a broad vertical surface, in the middle of which as a large and very irregular opening, with thin and ragged edges; this opening leads into a large cavity, which is named the maxillary sinus or outrum Highmoriousen. This situs corresponds, alasve. to the floor of the orbit, and postains in its upper wall the infra-orbitar canal; before, to the caume fossa and the upper and anterior dentar canal, which frequently forms a remarkable prominence to its interior; behind, where it presents the mark of the posterior dentary canals, to the maxillary tuberosity; below, by a surface less bread than in the other directions; to the alreoft of the molar, and sometimes of the canine teeth; the routs of these teeth often raise up the thin hony plate which forms the floor of the sinus, and perforate it. Entirely to the outside, the summit of this exvicy is firmed in the malar process, and the bony place, by which it is senarated from the cheek-hone, is so thin as to be frequently broken when that home is reparated. The orithre of the sinus, which is amortimen double, and communicates with the middle secator of the name, to articulated, above, with the ethinual hone; below and before, with the inferior turbinated bone; behind, with

the palate bone, by all of which it is very much contracted; this cavity is lined by a prolongation of the pituitary membrane. At the lower part of the aperture of the sinus, there occurs an oblique slit, directed forwards and outwards, which receives a plate of the palate hone; the posterior lip of this slit is inclined into the sinus, and the anterior toward the rusal fesses. At the upper part of the same aperture, there are portions of cells which unite with those of the ethnoid bone; before it is a deep channel, narrower at the middle than at its extremitles, directed obliquely downwards, backwards, and inwards, continuous with the lachrymal groove, and forming the greater part, sometimes even the whole, of the lachrymal canal. Behind the orifice of the sinus, there are observed an uneven surface, which is united to the palate bone, and a superficial groove which proceeds downwards and forwards, and contributes to form the posterior palatine conal. The two aspects of the upper maxillary bone are separated by an sneven eminence, which is called the maxillary tuberosity. It is much more prominent in young than in old subjects, because it contains the growing wisdom tooth. It is perforated by the posterior dentar canaly, which open externally in the form of two or three small holes, and which, as well as the anterior, disappear as they approach the alveoli, and leave the nerves and vessels to descend from one cellule to another, in the diploe of the bone. Anteriorly, between the two aspacts of the bone, there is observed a free edge, deeply concave at its upper part, which forms a portion of the anterior aperture of the unsal fosse. At its lower part it is prominent, and articulates with the bone of the opposite side, and in its middle presents an eminence which forms the half of the anterior nazal spine. This edge unites above with that which terminates anteriorly the nasal process, forming a more or less projecting angle with it. At the lower part, the two aspects of the bone are separated from each other by the alscolar process. This is thick, less so, however, before than beliml, where the buccinator muscle is inserted; it describes in its course a portion of a parabola, and is hollowed by deep content cavities for the teeth, named alveoli or socketz; the form and dimensions of these

alveoli vary occording to the kind of teeth which they lodge; and when the teeth have several roots, they are divided into a similar number of subordinate cavities by particular septa. The alveolus of the first incisor is deeper and broader than that of the second, but much less so than that of the canine tooth, which is generally flattened, and ends in a very sharp point. Times of the small molares are not so deep; the most variable is the last. Each maxillary bone has eight of these alveoli, the partitions of which are formed of a cellular tissue, which is found to be less and less compact posteriorly. Externally, the alveolar process presents pruminences and depressions corresponding to the alveoli and their partitions; on the inside, it is perforated with a great number of small holes, which transmit vessels to the walls of these cavities. The upper maxillary bone is cellular only toward its different processes, and in the alveolar margin. It is hollow, and as it were inflated in nearly its whole extent, on account of the presence of the sinus which is in its interior. It is articulated to the ethmoid, the frontal, the nasal, the lachrymal, and the palate, the inferior turbinated bones, the vomer, the opposite maxillary bone, the teeth of the upper jaw, and sometimes the sphenoid bone. Its development is very complicated. At an early period there appear some osseous nuclei, which commence the formation of the upper alveolar arch. The sinus is only developed with age, and sometimes, though rarely, is not formed at all. The palatine process also arises from a separate germ, which forms the inner wall of the alveoli of that part corresponding to the molar and canine teeth; and other two centres anteriorly, or that corresponding to the incisive teeth, constituting in many persons true inter-maxillary bones. The malar and orbitar processes are also each produced by a separate point. In many cases also an isolated small bone forms the upper part of the nasal canal.

72. The Palale Boars were long considered by anatomists as portions of the upper maxillary bone. Each of them seems formed by the union of two plates joined at a right angle, one horizontal and inferior, the other vertical and superior. The korizontal or palatine portion is quadrilateral. Its super surface is amouth, and

forms part of the floor of the pasal forms. The lower carface is rough and uneven, and presents posteriorly a transverse ridge, and forms part of the arch of the palate; the inferior orifice of the posterior palatine canal is seen in this aspect. Anteriorly, this portion of the hone rests upon the palatine process of the upper maxillary bone, by means of an oblique edge; posteriorly, it is terminated by a second edge, named the gutteral, which is free, sharp, and notched, and gives attachment to the velum palati; this edge, by its union with the inner one, forms a projecting angle, which, on being united with that of the opposite side, constitutes the posterior nazal spine. Internally, it presents an uneven edge, much thicker than the others, articulated to the corresponding hone, and surmounted by a thin erest, which contributes to the formation of a groove into which the vomer is received. The sertical or ascoasting portion, is of an oblong form, slightly inclined inwards, broader and thinner than the horizontal, and rests upon the upper maxillary bone. Its inner surface, which enters into the composition of the masal fosse, presents helow a broad and superficial depression, belonging to their inferior meatus, which is separated from another depression situated above, and forming part of the middle meature, by a rough horizontal ridge (crista turbinalis inferior), united to the inferior turbinated bone. Its outer surface is in general uneven, and is articulated with the inner surface of the maxillary bone: it presents, posteriorly, a groove more or less deep, which contributes to the formation of the posterior palatine canal, and above, a small smooth triangular surface which is seen in the avgomatic fossa. The auterior edge of this portion of the bone is very uneven and thin, and is prolonged inferiorly into a very brittle bony plate, which contracts the entrance of the maxillary sinus, and is received into the slit of which we have made mention in describing that orifice. The posterior edge, which is equally uneven with the last, rests in a great measure upon the inner side of the pterygoid process; in order to be articulated to it, it is even frequently hollowed, in nearly its whole lengthby a narrow groove, broader below than above. At its union with the guttural edge of the horizontal por-

tion, there is observed a very prominent pyramidal ominence, inclined outwards and downwards / processus pyramidalis), which fills up the bifurention of the two wings of the pterygoid process. Superiorly and internally, this process is hollowed by three channels, the two lateral of which uneven, and furnished with slight asperities, receive the summit of these wings, while the middle one, which is smooth and polished, completes the pterygoid fossa; the inner groove is the deepest-Below, it presents a narrow surface belonging to the palatine arch, in which are seen the oritices of necessory posterior palatine canals, Externally, it forms part of the zygomatic fossa; and here the posterior palatine canal, ceasing to be in part formed in the maxillary bone, is entirely formed in its substance. The apper edge is surmounted by two eminences, the anterior of which is larger than the other, a little inclined outwards, and is named the orbitar process; it is supported by a contracted portion, forming a sort of seck or pedicle, on the inner side of which there are observed a slight ridge (crista turbinalis superior), which is articulated with the athmoidal turbinated hone, and a small channel belonging to the superior meatus of the nasal fossie; the form of this process is such as to present five distinct surfaces: 1º An anterior, uneven, inclined downwards and outwards, which is articulated to the maxillary bone; 2º A posterior, deflected inwards and unwards, united to the spheroid hone by means of some rugosities surrounding a cellule, palatine sinus, in the substance of the process, which is continuous with the sphenoidal sinuses; 3º An outer, smooth, melined backwards, forming part of the zygomatic fossa; 40 An ioner, inclined downwards, concave, frequently hollowed by a cell, and united to the ethmoid bone; 50 An upper, smooth and plain, forming the innermost part of the floor of the orbit, separated from the outer by a small blunt edge, which contributes to the formation of the spheno-maxillary fissure. The other eminence of this edge is small, broad, and laterally flattened, and named the spheroidal process. Internally, it is smooth and contave, and forms part of the mesal fosse; externally, it enters into the composition of the avgomatic fossa; at the upper part, where it is very narrow, it

unites with the sphenoid bone, and presents a groove which forms the pterygo-palatine canal; in this direction, also, it is articulated with the ossa Bertini, portions of the sphenoid. These two processes are separated from each other by an almost circular notch, converted by the sphenoid bone into a hole, named the sphenopalatise, which corresponds to the pervons ganglion of the same name, and giver passage to nerves and vessels which penetrate into the unsal fosse. Sometimes the sphenoid bone does not in any degree contribute to the formation of this hole, which is entirely formed in the palate bone, a hony plate then stretching horizontally from one process to the other; very generally also the sphenoidal turbinated bone closes its summit. Stracture and Development.-The palate bones are very thin, and almost entirely formed of compact tissue, presenting cellular tissue only in the processes and horizontal portion. Their development, which is yet but little known, appears to take place by a single point of ossification, situated at the union of the vertical, horizontal, and pyramidal portions. Articulations.—This bone is articulated with the sphenoid and ethmoid, the sphenoidal turbinated bones, the upper maxillary bone, the lower turbinated bone, the vomer, and the opposite palate bone.

73. The Lackrywal Bones are placed at the inner and fore part of the orbit, occupying a quadrilateral irregular space situated between the frontal, ethmoid and superior maxillary bones. They present an orbitar aspect, which is external, smooth, divided longitudinally and in the middle, into two portions, by a thin and prominent ridge, forming a sort of hook at its lower extremity. Before this ridge, there is a channel perforated with numerous small holes, and entering into the composition of the lachrymal greats; it is covered by the walls of the lathrymal sac. Posteriorly, there is observed a plain surface, broader but shorter, and not cribriform. The annal aspect presents in its middle a groove, corresponding to the ridge of the orbitar aspect. Anteriorly to this groove, there is an uneven surface, forming part of the middle meatus of the misal fossæ; and behind it, there are rugosities which correspand to the anterior cells of the ethmoid bone, and which cover them. The spar edge is short, oneven, and articulated to the internal obitar process of the frontal bone. The forer, is divided into two portious by the extremity of the external ridge : it unites anteriorly with the lower turbinated home, by a thin plate, curved inwards, and elongated downwards, which contributes to form the nasal canal; and behind; with the inner edge of the orbitar surface of the apper muxillary bone; sometimes, the middle hook of this edge is wanting, and in that case, it is submitted by a small unciform supernumerary bone, which unites with the upper maxillary bone, on the outside of the superior orifice of the nasal canal. The third edge, which is purterior and very thin, joins the anterior edge of the orbitar surface of the etimoid bone. The fourth, which is auterior, is marked with a small groove, into which is received one of the portions of the posterior edge of the masal process of the upper maxillary hone. The tachrymal bone is entirely compact, extremely thin, and even transparent. It is developed by a single point of ossinication: and is articulated to the frontal, the ethmoid, the upper amxillary, and the inferior turbinated bones.

74 The Maxillo-Turbinated or Inferior Turbinated Bover, are of a very irregular form, elongated from behind forwards, rolled up upon themselves, wrinkled at their surface, and differently formed in different individuals. Each bone is suspended over the inner surface of the upper maxillary and palate bones of each side. in the musal fosse, where it determines the limits of the middle and inferior meatur. Its inner or must aspect is convex and prominent, especially in the middle; it is reticulated and traversed in its whole length by two arterial forrows. Its outer or maxillary aspect, which is smoother than the other, and free like it, is concave, and belongs to the inferior meatus of the nasal frage. The lower edge is free, spongy, rolled on itself from beneath upwards, and thicker at the middle than at the extremities. The upper colge, which is articular and uneven, presents behind a sort of spinous crest, which unites with a similar part of the painte bone, and before, a small and very thin margin, formished with minute asperities, which are articulated to the crest on the base of the usual process of the upper maxillary bone; in the

middle, it is surmounted by a small pyramidal eminence, (processus lackryosolis), which ascends toward the lackrymal lione, and which completes with it the musal canal, by some papyraceous lamina; (processus ethnoidales), which unite with the ethnoid bone, and by a kind of scale curved downwards in the form of a look, (processus musillasis), which partly contracts the orifice of the maxillasis), which it is engaged. The two edges of this bone units so as to form two ougles, a posterior and an nutrior. The former of these angles is the sharper and more clougated; both are joined to the ridges, which the corresponding superior

maxillary and palate bones present.

75. The Naval Bones are of a small size, quadrilateral, and occupy the interval existing between the two ascending processes of the maxillary hones; they are thick at the upper part, thin below. The unterior napred is concave from above downwards, convex transversely. The posterior or nasal aspect, which is concave, uneven, especially at the upper part, and narrower than the anterior, presents more distinct farrows. upper edge is denticulated, short, inclined backwards, thick, and united to the nasal notch of the frontal bone. The lower edge is longer, thin, sharp, and inclined obliquely backwards and downwards. It joins the lateral cartilage of the nose, and presents in its middle a narrow. notch for the passage of the terminating branch of the internal nusal nerve. The outer edge, which is very long, uneven, and sloped, supports the ascending proeess of the maxiflary bone, and is often furnished below with two or three small prominences in the form of teeth, which are received into holes formed on that process. The inner edge, which is broad above, and narrow below, is articulated with the bone of the opposite side, forming a ridge with it behind, in which there is a granve for receiving the anterior extremity of the perpendicular plate of the ethmoid bone, and the musal spine of the frontal. The musal bones present cellular tissue in almost their whole extent, but especially at They are developed by their opper and inner salges. a single point of ossification.

76. The Malor, Os Jagute, or Check House are of an irregular square form, situated on the upper and lateral

parts of the face, forming the orbit externally, and constituting the region of the cheek. The outer aspect in convex anteriorly, flat posteriorly, smooth, quadrilateral, and presents in its centre one or more small holes, named stalor, for the passage of vessels and nerves. holes are the critices of canals, whose course is very vague and little known. The upper aspect is smaller, concave, and smooth, and constitutes part of the orbit; it forms a right angle with the outer aspect, behind and above which it is situated; the posterior orifice of oneof the malar holes is observed upon it. It is circumscribed posteriorly, by an edge which is ragged above, where it is articulated to the frontal and sphenoid bones, and below, where it unites with the upper maxillary bone, but smooth in an angle formed at its middle part, which cuters into the formation of the spheno-maxillary fissure. The pusterior aspect is also concave, is smooth behind, where it forms part of the temporal fossa; but anteriorly it presents a rough triangular surface, by which it is articulated to the malar tuberesity of the upper maxillary bone. In its posterior half, there is observed the orifice of a small malar canal. * Of its four edges, two are auterior and two pasterior. Of the two anterior, the upper is smooth, concave, rounded, and forms part of the circumference of the orbit; while the lower is uneven, rough, and connected with the maxillary hone. Of the two posterior, the apper is thin over the greater part of its extent, more or less twisted in the form of the letter S, and gives attachment to the temporal aponeurosis; the lower, thick, especially at its fore part, uneven, and nearly straight, affords insertion to the masseter muscle. These four edges form an equal number of angles by their junction. The upper angle is very prominent, thick, and denticulate, and joins the external orbitar process of the frontal hone. The lower angle, which is much shorter, is articulated to the malar tuberosity of the upper maxillary bone, The auterior angle, which is very thin and aloned, formsthe same connexion on the edge of the orbit; and the posterior, which is longer and more acute than the others, supports the summit of the zygomatic process. of the temperal bone, with which it forms the zygomatie arch. The malar bone is in general thick and cellular; its development commences by a single centre of ossification; and it is articulated to the frontal, tem-

poral, sphenoid, and upper maxillary bones.

77. The Fomer is a symmetrical azygous bone, forming the posterior part of the septum of the saxal force. It is thin, flat, quadrilateral, and smooth on its lateral surfaces, which only present vascular furrows, and a narrow groove at the lower part which marks the passage of the naso-palatine nerve. The sphosoidal edge is the thickest part of the bone, and is divided into two laminar, (alac coneris), which enter into the grnoves on the guttural aspect of the sphenoid bone, and which receive into the cavity formed by their separation, the rostrum situated between these grooves. The suprapolatine odge is the longest. Broad, obtuse, and uneven anteriorly, thin and sharp posteriorly, it is received into the groove which exists between the united maxillary and palate bones, as we have already said. The guttaral or posterior edge is free, thin below, thick and bifurcated above, straight unnotehed; it separates the two posterior apertures of the nasal fosse. The silmoidal or anterior edge, is marked in its whole extent, or at least in its upper half, by a deep irregular channel, which receives the lower edge of the perpendicular plate of the ethmoid bone above, and the triangular cartilage of the septum naris below. This channel is continued into that of the the sphenoidal edge. Sometimes it is wanting, and then the eartilage slightly overlaps the vomer on each side. The vomer is thin, compact, and transparent in almost its whole extent, and presents some traces of cellules at its upper part only-It originates by a single centre of ossification, which is composed of two laminas. It is articulated to the maxillary and palate bones, to the ethmoid and sphenoid, also to the turbinated bones of the latter.

78. The Inferior Maxillary Bose is symmetrical, and of a parabolical form; but the extremities of the curve which it describes are raised at nearly a right angle to the rest of the bone. The middle and horizontal portion is named the body, and the parts which are vertical and situated behind are termed branches (rans.) It forms the lower jaw, and may be divided into the following parts for description:—The outer or cotonoose.

aspect, is placed almost immediately under the skin at the fore part, but is more deeply seated behind. It is convex, and presents, in the median line, the symphists of the chin, a sort of vertical line which indicates the point of union of the two pieces of which the house consists in childhood; below this, there is a projecting surface, rough, and of a trimgular form, with the summit turned apwards, termed the second process. Above it, on each side, there is a superficial cavity, into which is inserted the lengtor wente nursele, and more outwardly, insmediately beneath the first or second small grinder. the external orifice of the lower dentar canal, named the wental faramen, which gives passage to the vessels and nerves of the same name; it is oval, and directed obliquely backwards. From the two inferior angles of the mental process, there arises, on either side, a slightly prominent line, which at first follows a horizontal direction, and afterwards rises obliquely backwards, to be continued into the anterior edge of the coronoid procoss; this line, which is rather indistinct in the middle, is the external oblique line. Along its margin, by the side of the alveoli, there runs a channel, which terminates at the inner side of the coronoul process, and gives attachment in its posterior half to the buccinator muscle. Lastly, at the back part, is the external surface of the ramus of the jaw, which is quadrilateral, and somewhat uneven. The inner or lingual aspect is concave, directed towards the eavity of the mouth, forcoved in the middle by the symphysis of the chin, beneath which are observed four emineness named the genial processes, They are placed in pairs above each other, the two upper giving attachment to the genia-glossi muscles. the two lower to the genis-bysidel. Above, and on each side of the genial processes, are two cavities, which lodge the sublingual giands, and under them, two rough depressions for the insertion of the digastric muscleswhile, just at their level arise the internal oblique lines. more prominent than the outer, especially at the back part, where they form a sort of rounded promoteness They ascend toward the coronnal processes, and give insertion anteriorly to the myle-hyphics muscles, and posts, riorly to the superior constriction of the plary on Beneath the inner oblique line, and posteriurly, there

is observed an oblong superficial cavity in which the submaxillare gland is placed. In this cavity is also seen a furrow, which ascends towards a protty large irregular foramen, which forms the entrance of the maxillary or inferior dentur canal; this foramen presents a very distinct spine above, and in the rest of its circumference, several inequalities for the insertion of the internal lateral ligament of the jaw; it gives passage to the vessels and nerve of the same name, a branch of which runs along the furrow situated under it. This prifice occupies the centre of the inner surface of the rami of the jaw, which is marked at its lowest part with inequalities, to which are attached the fibres of the pterygoidens interaus. The lower edge, named the have of the jour, is horizontal, rounded, obtuse before, contracted behind, and traversed at the distance of two-thirds of its length from the chin, and opposite the second large molar tooth, by an ascending channel, which lodges the facial artery. It presents a remarkable bulging in the middle of its course, and gives attachment to the platysma myoides. The opper or alreafor edge is of considerable breadth, more so, however, behind, whereit is a little deflected inwards, than before, where it retains its straightness. In its substance there are formed sixteen aleredi, which are intended for the reception of the inferior with, and constitute together the lower alcualar arch. As in the upper jaw, the alynoli here vary in their form according to the kind of teeth which they receive: the two middle are the smallest and narrowest; those which succeed them are a little larger; but the third on each side, which coutains the canine touth, is evidently the deepest; those of the small grinders, which come next, are shorter, and are commonly single; the sixth on each side, which is square and generally divided into two, is the widest; the seventh has nearly the same dimensions and form; but the eighth is smaller, somewhat triangular, and in general presents two or three cavities, and sometimes only one; its inner wall forms a remarkable prominence above the oblique line, and is much thinner than the outer. All these pavities are perforated, at their summit, by small apertures for the passage of vessels and nerves which are distributed to the tooth. The alveoliand the partitions which separate them, form prominences and depressions of various sizes on both sides of the dentary arch, which are always most distinct in the middle and anteriorly, than on the sides and posteriorly, where they are sometimes not seen at all. These parts are covered by the gums. The alveolar arch is surmounted posteriorly by the coronaid process, a triangular eminence, slightly inclined outwards at its summit. It seems to arise anteriorly from the union of the outer and inner oblique lines, which approach each other as they ascend, leaving in their interval a groove into which the buccinator muscle is inserted. The internal oblique line is prolonged on its inner surface, and forms there a pretty considerable projection-The posterior or parotideal edge is free, blunt, nearly vertical, and forms, with the lower edge, the angle of the jaw. The posterior edge is covered nearly in its whole extent by the parotid gland, becomes gradually broader towards its upper part, and is terminated above by an oblong convex eminence, higher within than without, bent forwards, and directed obliquely inwards and backwards, so that its axis, if prolonged, would form an angle of from 110° to 146° with that of the opposite side; this eminence is the condyle, and serves to articulate the lower jaw with the temporal bone. At the back part, it gradually loses its convex form : anteriorly it is somewhat curved, and presents an uneven ridge; externally, it presents a small tubercle, which gives attachment to the external lateral ligament of the joint. The condyle is supported on a contracted neck, which is marked anteriorly by a depression into which the pterygoideus externus is inserted, and gives attachment, externally and above, to the external lateral ligament. It is separated from the coronoid process by the sigmoid notch. The lower maxillary bone is formed of a thick plate, bent upon itself, compact externally. cellular within, and traversed in the greater part of its extent, by the inferior deuter canal. This canal, whose position varies at different periods of life, passes obliquely through the substance of the hone, gradually diminishing in size as it proceeds, at the base of the coronoid process and under the summits of the alveolifrom the middle of the inner surface of the rami of the

jaw to the incisive teeth; after which it turns back upon itself, forming an angle, and terminates at the mental hole. From the angle formed by its reflection there arise two small subordinate canals, one inferior, the other superior, which lose themselves in the cellular tissue of the jaw. The dentar canal is lined in its whole extent by a plate of compact tissue, which is especially apparent near its orifices, for in the middle part it is so perforated with holes as to appear cellular ; of these holes, some which are larger penetrate into the alveeli so as to perforate their summit; the others transmit vessels into the areolar tissue of the bone which is very abundant. Sometimes the partition, which separates the canal from the alvooli, happens to be wanting, in which case the canal is exposed when the testh are taken out. The walls of the alveoli and their partitions are very spongy. It ought also to be remarked, that the dentar canal is nearer the inner surface of the jaw in the two posterior thirds of its course, and approaches the outer surface in the remaining third. Ossification originates by two centres, which unite at the symphisis of the chin. In very young fretuses, there is observed moreover a bony plate which forms the lower edge of the bone, and a separate nucleus for the coronoid process. It is articulated to the -temporal bones by the condyles, and to the sixteen lower teeth.

OF VHE ORBITS.

79. The Orbits have the form of a pyramid with the base torned forwards, but whose axis, being directed obliquely inwards, causes the summit to incline in that direction. Their walls represent four triangular surfaces. The upper scall or result is slightly inclined backwards; it is concave and formed anteriorly by the frontal bone, posteriorly by the process of Ingrasias; near its summit, and to the inside is the optic hole, directed obliquely backwards and inwards, so that were its axis prolonged, it would intersect the one on the other side at the pitnitary fossa. Before it, is a portion of the sphenoidal suture of the cranium, anteriorly, and to the outside, the small fossa which lodges

the lackrymal gland, and internally the inequalities to which the cartilaginous pulley of the obliques superior muscle of the eye is attached. The lower wall or the floor of the orbit is nearly plain, and inclined outwards and downwards. Formed at its fore part by the cheek bone; in the middle by the orbitar surface of the upper maxillary bone; posteriorly and inwards, by one of the small surfaces of the anterior process of the upper edge. of the palate hone; and it is intersected at the point where these three banes meet, by two sutures whose denticulations are not very distinct, and of which the posterior is of very small extent. At its posterior and external part, is seen the infra-orbitar gronve, to which succords the infra-orbitar canal. The outer wall is plain, and formed in two posterior thirds, by the sphenord bone, and in the anterior third by the malar. A vertical suture, with large serratures, marks the place where these two bones units, and at its fore part are observed the internal orifices of the nullar holes. The inner wall is of much smaller extent than the others; smooth and perfectly plain; three bones enter into its composition; the lachrymal before, the ethinoid in the middle, and the sphenoid behind. Two vertical sutures result from the juxtaposition of these bones, and present themselves under the appearance of two slightly uneven and very narrow slits. The apper well in uniting with the inner and outer, farms two retiring angles. The first of these angles contains, anteriorly, the suture which results from the articulation of the frontal and lachrymal bones, and a little behind this, the ethmoidal suture of the cranium, in which are seen the internal orbitar foramina, to the number of two or three. The second presents posteriorly the sphennidal fissure; in the middle, a part of the sphenoidal suture of the granium, and anteriorly the articulation of the frontal to the malar bone. The lower well also forms two retiring angles where it joins the inner and outer walls. The first presents the suture which results from the ar-Beulation of the upper maxillary and palare hours to the inchrymal and ethmoid. The second is perforated posteriorly by the sphero-maxillary or inferior welcome fiscare. This fissure is formed at its upper part by the sphenoid hone, below by the opper maxillary bone, an-

teriorly by the mular bone, and posteriorly by the palate bone. It is less wide in the middle than at its extremities, is closed up by fat in the recent state, and gives passage merely to a few vascular and nervous ramifica-The circumference of the orbit, or its base, is irregularly quadrilateral, wider externally than internally, directed obliquely downwards and outwards, and presents, at its upper part, the orbitar arch and superciliary hole, and at its lower, the articulation of the malar tuberesity with the cheek bone. It presents externally a short, denticulated suture formed by the cheek bone and the external orbitar process of the frontal hone; and internally the lackrymal groose, formed by the os unguis and the masal process of the upper maxillary bone, and consequently divided into two portions by a longitudinal suture. This grouve, which lodges the lachrymal sac, terminates below in the nasal canal. The circumference of the orbit gives attachment particularly to the orbicularis palpebrarum. The axis of the orbit, which forms a slight angle with that of the optic hole, is however, like it, placed so obliquely that it would meet posteriorly that of the opposite side, but at a point behind the intersection of the axes of the optic holes. The inner wall alone proceeds directly backwards, parallel to that of the other orbit. The three others are inclined. The hones entering into the composition of the orbit, are the sphenoid, ethnoid, frontal, upper maxillary, palatine, lachrymal and malar bones.

OF THE NASAL YOSSAL

80. The Nasal Fosse present anterior and posterior apertures. The anterior is heart-shaped, broader below than above, and formed by the masal and upper maxillary bones. It is sharp and generally uneven in its upper part, and rounded below; in the middle it presents a prominence, formed by the union of the masal bones, and limited laterally by the small notches which give passage to the branches of the internal again nerve. Below, it presents the auterior masal spend, which surmounts a vertical suture, on the sides of which suture are the myetiform flows. The pasterior aperture of the masal flosse is of an elliptical form,

divided mentally and vertically by the comer, and bounded above by the body of the sphenoid; laterally, by the internal lamina of the pterygoid processes; and inferiorly by the horizontal plates of the palate bones : to the margins of the latter is suspended the velum pendulum-pulati; and to the posterior usual spine, which is placed in the middle of this margin, is attached the levator uvalue. The curves nasi-nores interner are of an irregular form, broader below than above, but longer in the latter direction, higher in the middle than before and behind, and presenting several appendages, which are formed by the different sinuses that exist in the bones of the head. Separated from each other by an intermediate septum (septum narium), formed by the perpendicular plate of the ethmoid bone above, and the vomer below and at the back part: they occupy the space situated beneath the anterior part of the base of the cranium, above the mouth, between the orbits, the canine, temporal, and zygomatic fossie, and before the guttural cavity. Their walls are four in number, terminating anteriorly at the nose, and posteriorly at the throat. The upper wall or vault of the musual fossie is disposed in three different directions; anteriorly, where it is formed by the bones of the nose, it looks backwards and downwards; in the middle, where there is seen the cribriform plate of the ethmoid hone, it is horizontal; posteriorly, where it belongs to the body of the sphenoid hone, it is turned forwards and downwards. In the first portion, is observed the inner surface of the nose, much narrower than the outer, surmounted by a crest towards the middle line, concave transversely, straight from above downwards. marked with a furrow for the internal nasal nerve, and perforated with one or two small vascular apertures, It presents externally the suture, which joins the nasal process of the upper maxillary bone to the musal. At the union of the anterior with the middle portion, there is observed a somewhat indistinct suture, formed by the musal match of the frontal hone and the bones of the nose; then a small concave longitudinal surface. marked on the sides of the masal spine of the frontal bone, and applied posteriorly upon the cribriform plate, the holes and small fissures of which are purceived

farther back. This part of the vault is very thin and narrow. Posteriorly, the cribriform plate forms a suture with the sphenoid bone and its turbinated bone. It is there that the third portion commences, in which are observed the lower and inner surfaces of the sphenoidal turbinated bone, and the orifice of the sphenoidal sinuses; this aperture in this view is narrow and regulary rounded, and always occupies the upper region of the sinus. Lastly, beneath this latter, is the articulation of the vomer with the sphenoid bone. This region of the nasal fossee is extremely thick, and of much greater extent than it seems at first sight to be, on account of the existence of the sinus, which prolongs it belond, and thus augments its surface. The lower scall or Moor of the nastl fossas is rectilinear, and does not vary its direction like the vault. It is concave transversely, and slightly inclined backwards. Belaind the superior orifice of the anterior palatine canal, it destends a little forwards, after being slightly raised, anteriorly it is prolonged a little more on the inner side than on the outer by the anterior nasal spine. Thereis observed upon it the orifice of the anterior palatine canal; and just at the point of junction of the vomer with the maxillary bone is seen the entrance of the small canal for the nasa-palatine nerve. Toward the posterior third of this wall, there is a squamous suture, formed by the palatine and upper maxillary bones, and which is here much less distinct than it is on the palatine arch. Posteriorly, it is terminated by a notefied edge, which is somewhat raised, and by the posterior nasal spine. The inner wall of the nasal fosse is the least complicated, and is formed by one of the surfaces of the septum which separates these cavities. This septum is often deflected to the right side, and then the inner wall of the left masal fossa is concave, and that of the right convex. In other circumstances, on account of the vertical plate of the ethmoid bone being laterally united to the anterior edge of the vomer, there occurs on one side a prominent oblique line, and on the other a corresponding groove; or there may also be observed an aperture of greater or less size. This septum is composed of the vamer, the perpentlicular plate of the ethmoid bone, a crest of the frontal

bone, another of the pasal bones, and a third formed by the upper maxillary and palate bones. It is marked by numerous vascular and nervous furrows; presents at its upper part the lower orifices of the internal offictory canals; is cut autoriorly by a large triangular notch; and is terminated behind by the guttural edge of the vomer: The outer wall of the nasal fosse presents most important objects of examination. upper and fore part, there is observed the union of some transparent and irregular lamelle of the ethnoid bone with the frontal bone, and the nasal process of the upper muxillary bone, of which the internal surface is seen a little beneath, where it forms part of the middle meatus. A little farther back is a rugose and quadrilateral surface of the ethmoid hone, perforated by a great number of olfactory canals, shaped like the point of a pen, more or less long and oldique. The surface becomes convex posteriorly, and directs itself outwards to unite with the spliencidal turbinated bone, and with the sphenoid bone itself. From this arrangement. there results a vertical channel between the body of the aphenoid bone and the lateral masses of the ethmoid, which ends above at the orifice of the sphenoidal sinus, and below at the superior meatur. This sume surface is prolonged forwards over the middle turbinated bone: but, posteriorly, it is suddenly limited by the superior turbinated bone, which is formed by a thin plate of the ethmoid bone, inclined downwards and backwards, convex internally, concave outwards, limited anteriorly by a cul-de-sac, gradually terminated behind towards the vertical channel, and below, determining the form and extent of the superior meature. This meatus is a horizontal channel, occupying only the posterior part of the wall under consideration, perforated anteriorly by one or two apertures, which lead into the posterior cells of the ethmoid bone, and posteriotly by the spheno-palatine hole, which is formed by the pulate bone, the sphenoid bone, and frequently by its turbinated bone, which is sometimes double, and which always perforates directly the natur wall of the masal fosse from within outwards. This hole gives passage to the nervex and vessels of the same same, and opens into the spheno-maxillary form. Beneath the

superior meatus, is the middle or ethnoidal turbinated hose, larger and more curved than the upper, this above and thick below, convex inwards, and concave externally; its surface is wrinkled, and sometimes the small olfactory channels are prolonged as far as its loweredge. It belongs to the ethmoid bone, and is terminated behind by free inequalities. It occupies only about the middle third of the outer wall of the nasal fosse, and principally forms their middle meatur. This meatur is of much greater extent than the upper, and presents from before backwards, I', A portion of the inner surface of the nasal process of the upper maxillary bone; 2", A suture which it forms with the Jackrymal hone; 3. The anterior part of the inner surface of the latter hone, the pures with which it is perforated, and its union with the ethmoid bone; 4°, A portion of this latter, which has a incerated appearance, and is articulated to the upper maxillary bone; A. The infundibulum, which leads into the anterior ethmoid cells, and frontal sinus; 67. The entrance of the maxillary sinus, which is contracted by the ethinoid bone, the inferior turbinated bone, and the palate bone, and situated toward the posterior third of the wall, always above the floor of the sinus; this aperture is sometimes double, and is further contracted, in the recent state, by a glandular organ, lodged in the substance of the pituitary membrane, Beneath the middle meatus is the inferior turbinated hone suspended by its unniform process, which penetrates slowly into the maxillary sinus. This have lies over the inferior meature, which consists of a horizontal channel, enneave from above downwards, and straight from before backwards, formed above by the inferior turbimated bone, anteriorly, where it is broader, by the upper maxillary bone, and posteriorly, when it is contracted by the palate bone. In this meatus is the inferior orifice of the wasal casal, which is situated anteriorly. and concealed by the lower turbinated bone: this aperture is inclined a little obliquely backwards, and varies much as to its position with respect to the entrance of the nostrils, being sometimes but a line or two distant from it, and sometimes upwards of a finger's brendth. The nasul canal is formed by the upper maxillary hone, tocether with the lower turbinated and lachrymal bone;

it ascends towards the lackrymal canal by describing a slight curve, the convexity of which is turned forwards and outwards; it is ourrower at the middle than at the oktermities; its diameters are not all equal, it being a little compressed; it is lined by a mucous membrane. The bonos of which these cavities are composed, are the sphenoid, ethmoid, sphenoidal turbinated, frontal upper maxillary, pulate, nasal, inferior turbinated, and the vomer.

OF THE SUTURES FORMED BY THE UNION OF THE GRANIUM AND PAGE.

St. Almost all the points at which these two parts come into contact present sutures with very distinct denticulations. Thus there is one situated transversely above the nose, and formed by the meeting of the resul and upper maxillary bones with the frontal bone; it is continued laterally into those of the internal orbitar processes and lachrymal hones; then there is observed, to the outside of the orbit, the suture which the frontal and sphenoid bones form with the malar bone; then that of the malar bone and the avgomatic process of the temporal bone; and lastly, the suture formed between the ascending portion of the palate bone and the pterygoid process; the latter is vertical, and very indistinctly marked. We ought also to include among the sutures of this class those which result from the articulation of the vomer with the sphenoid bone, of the inferior turbinated bones with the ethmoid, and of the latter bone with the palate and upper maxillary bones, always observing, that for the most part they present but very indistinct serratures, and that some of them even are nothing more than mere juxtaposition of surfaces.

OF THE TEMPORAL, EYGOMATIC, AND SPHENG-MAXIL-LABY POSSIE.

82. When the head is entire, the Temporal Fosse is limited below by the appoint orch, (areas appoint orch): this arch is directed forwards, has a double curvature, so as to be at once convex above and convex outwards, and is separated from the rest of the bones by a large empty space, filled up by the temporal mus-

cle; in its middle it presents a source resulting from the union of the two bones forming it, and so disposed that the temporal rests upon the malar, their edges being bere oblique: this suture is distinctly serrated. Before, the zygomatic arch, the temporal fosca is completed by a portion of the posterior aspect of the malar hone, in which are seen two or three small vaccular apertures. Posteriorly, a transverse ridge, formed upon the sphenoid hone, separates this fosca from the zygomatic.

83. Zygomatic Fossa comprised between the posterior edge of the outer wing of the pterygoid process and the ridge which descends from the malar tuberosity. The maxillary tuberosity is separated above from the pterygoid process, by a fissare which gives passage to the internal maxillary artery, and which Biehat named the pterygo-maxillary fissare; it is vertical, broad above, and narrow below; it unites in the former direction, nearly at a right angle, with the spheno maxillary fissare; and below, it is continued into two small vertical sutures, very close to each other, only separated a little below, formed by the articulation of the palar bende with the pterygoid process on the one hand, and the maxillary tuberosity on the other. The pterygo-maxillary leads into:

84. The spheno-maxillary form. This forms, which is deep and narrow, and is continued behind the orbit, is formed by the sphenoid bone behind, the uppermaxillary bone before, and by the palate bone to the inside. The sphenoidal, spheno-maxillary, and pterygo-maxillary fissures terminate in it, and seem to run into each other; there are moreover observed five apertures in it, which are, posteriorly and from above downwards, the anterior orifices of the foramen rotandum and of the vidian and pterygo-palatine canals; to the inside, the sphenopolatine hole, and at the lower part, the upper orifice of the posterior palatine canal. This fossa contains a part of the superior maxillary nerve, the ganglion of

Meckel, &c.

THE TEETH.

85. The Tarth require for their elucidation an extensive series of preparations, both in human and in comparative anatomy, and a constant appeal, therefore, to extensive museums; but the following brief outline o

their natural history, derived chiefly from the works of Mr. Hunter, will, it is hoped, be found interesting and useful. By taking a little trouble, many of the facts about to be mentioned may be verified in the dissecting room.

86. Structure.-A human tooth is composed of two substances, viz. enamel and ivory. The enamel, likewise called the cortical part, is found only upon the body of the tooth. It is by far the hardest part, entering into the composition of the body, and the bardest and best tempered saw makes its way through it simply by chipping off minute particles of it. When broken, it uppears fibrous or striated, and all the strice are directed from the circumference to the centre. The enumel is thickest on the grinding surface and cutting edges or points of the teeth, becoming gradually and insensibly thinner towards the neck. When exposed to the fire, it becomes very brittle, emeks, and grows black; but still it stands fire better than the bony part. It is in no shape vascular; and when dissolved in a weak acid, it shows no soft animal texture as a basis. The structure. therefore, of the enamel is ervatalline. Berzelins, who gave its chemical analysis, thinks there is a small trace of animal matter,* The remaining part of the tooth is called the lyony part, but it is in reality still harder than any of the bones companing the skeleton. It composes the interior part of the body, the neck, and This audistance is the whole of the root of the tooth. composed of two structures, the calcareous part and an animal substance; the analysis may be made by steeping it in an weid + Mr. Hunter concluded, from his experiments, that the structure as now described, viz. the

* Chemical analysis - Enmed. Oneses Texture.
Phosphate of Line858
Fluste of Lime, 3:2 and Sulphate of Lime, 3:0
Carbonate of Lime, 8-0
Phaspiate of Magnesia, 1-5
Soda and Muriate of Soda, 1-0 (no Muriate) 1-8
Animal matter and Water, I-0 Cartilage, 1

The ivery or bony part of a voite does not appear in have been emblyade.

coamel and ivory part of the tooth, have no circulation in them, i.e. have no vascular living connection with the rest of the body. After having long maintained this opinion, as unanswerable and unanswered, we are now willing to admit that there are certain difficulties in the way of this hypothesis, which it is impossible to explain away in the present state of our knowledge,such as the appearance of red patches in the ivory port of a tooth, and the deep tinging of the whole of a yellow colour in cases of saundice. In addition to these facts, which have been long noticed, but which, after all, are not conclusive against the hypothesis of Hunter, since the disculouration might be effected by imbibition, we may mention the still more important and curious fact, that in certain carious toeth the ivery part becomes red and seemingly soft. If there be no deception in this, it argues vital changes going on in the substance, incompatible with the notion of its being inorganic. Upon the whole, a striking analogy appears to us to subsist between this part of the tooth and the ossexus labyrinth of the ear.

87. Cavity of the tooth .- Every tooth has an internal cavity extending nearly the whole length of its bony part. It commences by a small opening at the point of each root, and therefore has one or more of these openings into it, according to the number of their roots-By these openings there pass blood-ressels and nerves into the interior of the cavity, which is moreover filled with a pulp. The pulp is enclosed by a membrane. A membranes usually called periodessu, lines the alveolar cavity, and invests the root of the tooth nearly as high as the neck. The number of the teeth in the adult ought to be thirty-two, sixteen being placed in each jaw. The body of a tooth is that part which projects above the gum; the roof or fang, that part enclosed by the alveolar cavity of the jaw; and the week is the somewhat contracted part between these two-The teeth are of three classes,-incisors or cutting teeth, canine or empidati, and grinders, of which the two anterior are called bienspidati, or small molar, and the three pasterior, malares, large molar, or multi-muspidati. Little need be said of the form and situation of the incisors and canine. There are eight of the former, and four of the latter. The twenty remaining teeth are usually termed molar or grinding teeth. The two anterior molar toeth of each side in each jaw, also termed biruspidate, are remarkable both for their smallness, and from the circumstance of their having been preceded by milk teeth, which does not happen in regard to the other molars (the suddicuspidate). The mattesting surface of these molar teeth is tubercular, and the form of these tubercles, number, &c., form striking characteristics in the natural history of animals. The articulation of the teeth is by gomphosis, and cosmibles a nail driven into a piece of wood.

88. The alveolar processes are covered by a red vascular substance called the gum, which has as many perforations as there are toeth, and moreover sends slips or
partitions between each, thus limiting the external and
the internal gum. The loss of this substance by discase, or when removed by a surgical operation, causes
the teeth to appear longer than they usually seem to
be, by exposing the neck, and a portion of the root of
the tooth; hence, also, in the skeleton, from the absence of the gum, the tooth appear unusually long.

89. We cannot do better than quote Mr. Hunter's admirable description of the forwation of the teeth in

the fatus: -

"The depressions or first rudiments of the alveoli observable in a factus of three or four months, are filled with four or five little pulpy substances, which are not very distinct at this age. About the fifth month both the processes themselves and the pulpy substances become more distinct, the anterior of which are the most complete. About this age, too, the ossifications begin on the edge of the first incisores. The esspilati are not in the same circular line with the rest, but somewhat on the outside, making a projection there at this age, there not being sufficient rosm for them.

"About the sixth or seventh month the edges or tips of all these five substances have begun to ossify, and the first of them is a little advanced; and hesides these, the pulp of the sixth tooth has begun to be formed: it is situated in the tubercle of the upper jaw, and under and on the inside of the coronaid process in the lower jaw. So that at this age, in both jaws, there are in all twenty teeth which have begun to ossify, and the stamins of twenty-four. They may be divided into the incisores, cospidati, and molares, he at this age there are no bicospides, the two last teeth on each side of both jave having all the characteristics and answering all the purposes of the true molares in the adult, though when these first molares fall out, their places are taken by the bicospides...

"The teeth gradually advance in their oscification, and about the seventh, eight, or ainth about after both, the incisors begin to cut or pass through the gumes first, generally, in the lower jaw. Before this time the oscifications in the third grinder, or that which makes

the first in the adult, have begun.

"The cospidati and molares of the forms are not formed so fast as the incisors; they generally all appear nearly about the same time, vir. about the two-tieth or twenty-fourth month; however, the first grander is often more advanced within the socket than the cospidatus, and most commonly appears before it.

"These twenty are the only teeth that are of use to the child from the seventh, eighth, or much mouth, till the twelfth or fourteenth year. These are called the temporary, or milk teeth, because they are all shed between the years of seven and fourteen, and are supplied

by others."

90. We shall next proceed with the consideration of the permanent tech. It is here that the views of Mr. Hunter have been deemed "exceedingly imperfect." How far this language can apply to any research in which Mr. Hunter was ever engaged, we have exceedingly strong doubts. That some minute points in the history of the development of the permanent tech have been more completely elucidated, and even a new fact or two made out by the labours of Dr. Blake and others, may readily be conceded. To these facts, such as they are, we shall of course give due consideration; but it seems to be a duty we over to Mr. Hunter's memory, to submit to the student his views in the first place, which, however imperfect they may be, most undoubtedly contain few or no inaccurrances:—

"In this inquiry, (Mr. Hunter remarks,) to avoid confusion, I shall confine the description to the treth in the lower pay, for the only difference between those in the two jaws is in the time of their appearance, and

generally it is later in the upper jaw. Their formation and appearance proceed not regularly from the first incisor backwards to the deas sapientice, but begin at two prints on each side of both jaws, viz. at the first incisor and at the first molaris. The teeth between these two points make a quicker progress than those behind.

"The pulps of the first adult incisor and of the first adult molaris begin to appear in a feetus of seven or right morths; and five or six months after birth the ossification begins in them. Soon after birth the pulps of the second incisor and cospidatus begin to be formed, and about eight or nine munths afterwards they begin to ossify. About the fifth or sixth year the first becaspis appears; about the sixth or seventh, the second bicuspis and the second molaris; and about the twelfth, the third molaris, or dens sanientiae.

"The first five may be called the permanent teeth; they differ from the temporary in having larger langs. The permanent incisors and cuspidati are much thicker and broader; and the melans are succeeded by bicuspides, which are smaller, and have but one fang.

"All these permanent or succeeding teeth are formed in distinct alveoli of their own, so that they do not fill up the old sockets of the temporary teeth, but have

their new alveoli formed as the old ones decay.

"The first incisor is placed on the inside of the root of the corresponding temperary tooth, and deeper in the irw. The second incoor and the cuspidates begin to he formed on the inside, and somewhat under the temporary second incisor and cuspidatus. These three are all situated much in the same manner with respect to the first set, but as they are larger they are placed somewhat further back in the circle of the jaw.

"The first becaspis is placed under, and somewhat further back than the first temporary grinder, or fourth

tooth of the child.

"The second bicaspis is placed immediately under

the second temporary grinder.

"The second motaris is situated in the lengthening tolerele in the upper jaw, and directly under the coroanid process in the lower

"The third molaris, or dens suplenties, begins to form

immediately under the commoid process.

"The first adult molaris comes to perfection and musthe gums about the twelfth year of age, the second about the eighteenth, and the third, or dens sapiontia, from the twentieth to the thirtieth; so that the ingisores and cuspidati require about six or soven years from their first appearance to come to perfection, the bienspides about seven or eight, and the nulsars about twolve.

" It sometimes happens that a third set of tooth appears in very old people; when this three happen it is in a very irregular manner, sometimes only one, at other times more, and now and then a complete art comes in both jaws. I never saw an instance of this kind but once, and there two fore tooth shot up in the

lower jaw.

Al should suppose that a new alventar process must he also formed in such cases, in the same manner as in the production of the first and second sets of teeth-From what I can learn, the age at which this happone is generally about seventy. From this circumstance. and another that sometimes happens to women at this age, it would appear that there is some effort in nature to renew the body at that period,

"When this set of teeth which happens so late in life is not complete, especially where they come in one jaw and not in the other, they are rather hurtful than useful, for in that case we are obliged to pull them out.

as they only wound the opposite gum."

91. It has been objected to this view, that the formation of the permanent treth, although essentially process. ing upon the same general principles, and produced by a similar structure as that by which the nonquency tooth are formed, yet differ in some points. The redmonts of the permanent teeth, it is said, instead of being original and independent, like those of the temporary, are in fact tlerived from them, and remain for a considerable time attached to, and intimately connected with them. The authors of these remarks forget that there must be twelve teeth to whose formation no such state. ment can apply, and that therefore the remark conton he true of all the persuament touch, but only applies to some of them. At an early period in the formation of the temporary teeth, the investing me or capsule gives

of a small process like a bud, and this process contains a portion of the essential rudiments, viz. the pulp, with its investing membrane, blood-vessels and nerves. Now, this process or had of the original or temporary pulp, constitutes the rudiment of the future permanent tooth. Attached to the parent sac by a pedicle or foot-stalk, the new rudiment is contained within the same alveolus as its parent ; by degrees, however, a distinct cell is excavated for its reception, and as the radiment continues to increase, becomes gradually separated from the parent sac, by the osseous cell being more and more deeply excavated in the substance of the bone, and also by the deposition of a bony partition between them. Notwithstanding that the new radiment is shut up in its proper socket, it is still connected with the temporary tooth by the cord or process of the capsule just described. It is thus supposed that no new set of vessels is required for the new or permanent pulp. Thus formed, the sac above, attached to the gum, and the pulp beneath, covered by its proper membrane, connected by its vessels with the jaws, the rudiment of the permanent tooth comes to have nearly the same relation as thuse of the temporary. It is undoubtedly true that certain of these facts have been made out; and in the young jaw, say within a year old, there may be seen behind the temporary teeth a row of openings in the alveolar process, leading into cavities in which are contained the growing permanent teeth, already considerably advanced; but whether the cord or pedicle which is supposed to connect the pulp of both sets together, passes through this opening, has not been very clearly made out. We may here take the liberty of remarking, that Mr. Hunter is slightly in error when he thinks that the orifice in the alveoli, just described, enlarges sufficiently to allow the permanent tooth to pass up through it, the fact being that the osseous partition is simply broken down, and the two orifices become one; at least this is the appearance presented by numerous specimens now before us.

99. Mr. Hunternext proceeds to the manner in which a tooth is formed; and here we shall find his description equally admirable and equally unobjectionable. We cannot, therefore, do better than quote his opinions

in his own words,-

"The body of the tooth is formed first, afterwards the enamel and fangs are added to it. All the teeth are produced from a kind of pulpy substance, which is pretty firm in its texture, transparent, excepting at the surface, where it adheres to the jaw, and has at first the shape of the bodies of the teeth which are to be formed from it. These pulpy substances are very recular: they adhere only at one part to the jaw, viz. at the bottom of the cavity which is to form the socket, and at that place their vessels enter, so that they are prominent and somewhat loose in the long cavity which ledges them.

"They grow nearly as large as the body of the tooth before the ossification begins, and increase a little for some time after the ossification has began. They are surrounded by a membrane, which is not connected with them, escopting at their root or surface of adhesion. This membrane adheres by its outer surface all around the bony cavity in the jaw, and also to the gum

where it covers the alvesti-

"When the pulp is very young, as in the feetus of six or seven months, this membrane itself is protty thick and gelatinous. We can examine it best in a new-born child, and we find it made up of two lameline, an external and internal: the external is soft and spongy, without any vessels; the offer is much firmer and extremely vascular, its vessels coming from those that are going to the pulp of the tooth; it makes a kind of capsule for the pulp and body of the tooth. While the tooth is within the gum there is always a mucilaginous fluid, like the synovia in the joints, between this membrane and the pulp of the tooth.

"When the tooth cuts the gum, this membrane likewise is perforated, after which it begins to waste, and is entirely gone by the time the tooth is fully formed, for the lower part of the membrane continues to adhere to the neck of the tooth, which has now risen as high

as the edge of the gum."

 It has been objected by a Landon doubtst to Mr. Hunter's statement, "that the bone of a touch is praduced from the pulp, "is erroneous." All that can possibly he objected to Mr. Hunter is, that the exceedingly delicate membrane or epithelum lavesting the pulp seems either to have escaped his notice, or to have been omitted by him in his description, or finally, to save been confounded by him with the capsule forming. the enamel; for in the above description he has undoubtedly described, and very clearly too, the capsule of the enamel, but not so clearly the capsule of the pulp; it would seem to be upon the outer surface of this membrane of the pulp that the assesses deposit constituting the ivery part of the tooth is formed; but some have thought that it may take place between the layers of this very delicate membrane; this latter opinion, however, is not a very probable one. The double investing sac, described in the above passage by Mr. Hunter, is generally esteemed to be the organ which secretes the enamel; and in animals having compound teeth, as the elephant, it also forms the crusta petrosa.

94. The oxification of a tooth upon the pulp is thus

described by Mr. Hunter:-

"The beginning of the ossification upon the pulp is by one point, or more, according to the kind of tooth. In the incisores it is generally by three points, the middle one being the highest, and the first that begins to ossify. The cuspidatus begins by one point only: the bicuspis by two, one external, which is the first and the highest, and the other internal. The molares, either in a child or an adult, begin by four or five ossifications, one on each point, the external always the first. Where the teeth begin to ossify at one point only, that essification gradually advances till the tooth is entirely completed; but if there is more than one point of ossification, each ossification increases till their bases come in contact with one another, and there all unite into one, after which they advance in growth as ome ossification.

"The assifications in their progress become thicker and thicker where they first began, but increase faster on the edges of the teeth; so as thence to become more and more bollow, and the cavity becomes deeper. As the assification advances, it gradually surrounds the pulp till the whole is covered by home, excepting the under surface; and while the ossifications advance, that part of the pulp which is covered by hone is always more vascular than the part which is not yet covered.

" The adhesion of the pulp to the new-formed tooth or bone is very slight, for it can always be separated from it without any apparent violence, nor are there any vessels going from the one to the other; the place. however, where it is most strongly attached is round the edge of the bony part, which is the last part formesh. When the bone has covered all the pulp, it begins to contract a little and becomes somewhat rounded, making that part of the tooth which is called the neck ; and from this place the fangs begin. When the fangs form, they push up the lodies of the teeth through the suckets, which waste, and afterwards through the gues, which also wastes, as has been explained upon the cutting of the teeth; for before this time the rising of the teeth is scarce observable, as the pulp was at first nearly of the size of the body of the tooth itself, and wasted nearly in proportion to the increase of the whole ossification.

"The pulp has originally no process answering to the fang; but as the cavity in the body of the touth is filled up by the ossification, the pulp is lengthened into a fang. The fang grows in length, and rises higher and higher in the socket till the whole body of the tooth is pushed out. The socket at the same time contracts at its bottom, and grasoing the neck or beginning fang, adheres to it and rises with it, which contraction is continued through the whole length of the socket as the lang rises; or the socket which contnined the body of the tooth, being too large for the lang, is wasted or absorbed into the constitution, and a new alveolar portion is raised with the fang; whence in reality the fang does not sink or descend into the jaw. Both in the body and in the fang of a growing tooth, the extreme edge of the ossification is so thin, transparent; and flexible, that it would appear rather to be horny than bony, very much like the mouth of edge of the shell of a small when it is growing ; and indeed it would seem to grow much in the same manner. gud the assisted part of a math would seem to have

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much the same connexion with the pulp as a small has with its shell.

"As the tooth grows, its eavity becomes gradually smaller, especially towards the point of the fing. In trueing the formation of the fing of a tooth we hitherto have been supposing at to be single, but where there are two or more it is somewhat different and more

complicated.

"When the body of a molaris is formed, there is but one general eavity in the body of the teath, from the beim of which the essification is to shoot, so us to form two or three fings. If two only, then the opposite parts of the brim of the eavity of the tooth shoot across where the pulp adheres to the jaw, meet in the middle, and thereby divide the mouth of the cavity into two openings; and from the edges of these two openings the two lings grow.

"We often find that a distinct conflication begins in the middle of the general cavity upon the root of the pulp, and two processes coming from the opposite edges of the bony shell join it; which answers the

same purpose.

"When there are three fangs, we see three processes coming from so many points of the brira of the cavity, which meet in the centre and divide the whole into three openings; and from these are formed the three fangs. We often find the fangs forked at their points, especially in the bicuspides. In this case the sides of the fang as it grows rome close together in the middle, making a longitudinal groove on the outside; and this union of the opposite sides divides the month of the growing fang into two orifices, from which the two points are formed.

→ By the observations which I have made in naravelling the texture of the texth when softened by an acid, and from observing the disposition of the red parts in the tooth of growing animals interroptedly fod with madder, I find that the body part of a tooth is formed of lamellae placed one within another. The outer lamellae is the first formed and is the shortest; the more internal lamellae lengthen gradually towards the fing, by which toesns, in proportion as the touth grows langer, its cavity grows smaller, and its sides grow thicker."

95. Mr. Hunter was the first to explain how the

ename/ was formed :-

"From its situation and from the manner in which the teeth grow, one would imagine that the enumel is first formed; but the beny part begins first, and very soon after the enamel is formed upon it. There is another pulpy substance opposite to that which we have described; it adheres to the inside of the capsule, where the gum is joined to it, and its opposite surface has in contact with the basis of the above-described pulp, and afterwards with the new-formed basis of the tooth. Whatever eminences or cavities the one has the other has the same, but reversed, so that they are smoulded exactly to each other.

"In the incisores it lies in contact, not with the sharper cutting edge of the pulp or tooth, but against the hollowed inside of the tooth; and in the molaros it is placed directly against their base, like a tooth of the opposite jaw. It is thinner than the other pulp, and decreases in proportion as the teeth advance. It does not seem to be very vascular. The last time for examining it is in a firstes of seven or eight months old.

"In the graminiverous animal, such as the horse, cow, &u., whose teeth have the enamel intermixed with the bony part, and whose teeth, when forming, have as many interstices as there are continuations of the enamel, we find processes from the pulp passing down into those interstices as far as the pulp which the tooth is formed from, and there coming into contact with it.

"After the points of the first-described pulp have begun to ossify, a thin covering of enamel is spread over them, which increases in thickness till some time

before the tooth begins to cut the gum.

The enamel appears to be secreted from the pulp above described, and perhaps from the capsule which incloses the body of the tooth. That it is from the pulp and capsule seems evident in the horse, ass, ax, sheep, &c., therefore we have little reason to doubt of it in the human species. It is a calcareous earth, pre-baldy dissolved in the juless of our body, and thrown out from these parts, which are here as a gland. After

it is secreted, the earth is attracted by the bony part of the tooth which is already formed, and upon that

surface it crystallizes.

"The operation is similar to the formation of the shell of the egg, the stone in the kidneys and bladders and the gall stone. This accounts for the striated crystallized appearance which the enamel has when broken, and also for the direction of these strice.

"The council is thicker at the points and basis than at the neck of the teeth, which may be easily accounted for from its manner of formation; for if we suppose it to be always scereting, and had equally over the whole surface, as the tooth grows, the first formed will be the thickest; and the neck of the tooth, which is the last formed part inclosed in this capsule, must have the thinnest exat; and the lang, where the periosteum adheres, and leaves no vacant space, will have none of the ename!

"At its first formation it is not very hard; for by exposing a very young tooth to the air, the enamel gracks and looks rough; but by the time that the teeth out the gum, the enamel seems to be as hard as ever it is afterwards; so that the air seems to have no effect

in hardoning it."

96. The only remark we shall make respecting Mr-Hunter's account of the enamel is, that the peculiar pulpy substance spoken of by him, and which he considers as an organ secreting the enamel, has been found long ago to be merely the inner layer of the capsule itself, assuming a strong vascularity for the special purpose of secreting enamel; at the same time, it is right to mention that many accurate observers still adhere to the precise opinion of Mr. Hunter on this subject.

97. The growth of the two Jan Boses explains many circumstances in the shedding of the teeth. The jaw increases in all points till twelve mouths after tirth, but it never afterwards increases in length between the symphysis and the sixth tooth; nor does the alveolar process ever become a section of a larger circle. After this time the jaws lengthen only towards their articular extremities. The jaws of the very young and the very aged resemble each other, particularly towards the angles which are obtase. It is an admitted fact that the teeth fill up as the grown is worn away.

This readily enough happens so long as the central pulp and its membrane have not liven destroyed. Mr. Hunter does not believe in the continual growth of the teeth; this opinion was probably founded on certain facts observed in the teeth of the rodentia and other graniverous animals. Perhaps the more correct statement is to say that the teeth are never purfect innsmuch as the corona or crown is formed before the roots; and whilst these are completing, the former is continually wasting by mastication and gamequent trituration. Teeth are sometimes found very fully developed imbedded in the alveolar cavity, and which, baving never appeared above the gums, must present at least a tolerably perfect form. It is very probable, however, that the natural progress of a tooth throughout life is gradually to lengthen at the root until this process be completed, and then for its central cavity to fill up. This, though not constant, yet frequently happens, and in the teeth of some nnimals uniformly. In the meantime the corona is wearing down. No rational cause has been assigned for the shedding of the treth. In their usual healthy condition it is probable that the sensibility of the teeth depends on the nerves of the pulp; but when diseased, it seems probable that the born or more part of the tooth may acquire a morbid sensibility. The human tooth do not readily arrange themselves under any particular zoological class; they are specific, and do not suit the definitions of carniverous nor graniverous: like man himself, they form a class apart.

98. The crust which forms upon the teeth is composed of a large proportion of earthy phosphates com-

bined with mucus-

THE HYOLD SONE.

99. The name of Hyoid Bone (as Hyosles; uses Lingualia) is given to a bony arch, of a parabolical form, convex anteriorly, suspended horizontally from the styluid process of the temporal bone in the mide of the soft parts of the neck, between the base of the tongue and the laryna, composed of five distinct bones, and connected by ligaments moveable on each other. The piece which accurate the centre of the arch

is the largest and broadest; it is flattened from before backwards, and is of a quadrilateral form. Its auterior aspect is uneven and convex in the middle. The postsrior espect is concave and smooth; and is filled by a yellowish cellular tissue, which separates it from the epiglottis. Its lower edge is longer and more unequal than the upper. On each of the lateral edges, which are less sharp than the upper and lower, there is placed a slightly convex articular facet which is joined to the lateral pieces. Of the lateral pieces, two are long and two are short. The longer are called cormon inferiora or laryages; they are broader and stronger before than behind, contract in the middle, and terminate posteriorly in a small rounded head, covered in the recent state by a cartilaginous substance. Autoriorly, they present a plain surface which corresponds to that of the lateral edges of the middle bone. At the upper part they are limited by a smooth and sharp falciform edge, into which are inserted the hyoglassus and constrictor pharyngis medius. The two upper pieces (cornun styloiden, styloid hurus,) are short, pyramidal, inclined backwards and upwards, and terminated by a more or less prolonged point; they give attackment below to some fibres of the genio-glossus muscle, and above to the stylo-byoid ligament.

THE PELVIK

at once a powerful bony girdle for the articulation of the inferior or pelvic extremities, and a deep nearly circular cavity, in which is lodged a portion of the intestines and many of the urinary and genital organs. It is composed posteriorly by a continuation of the spinal column, under the names of secretor and coccyalatterly, by two broad and flat strangely twisted bones maned the som insosinom, which meeting in front arcstrongly articulated together. The descriptive anatomy of this region of the skeleton might be made very simple and short; but its importance and surgical relations are so great and numerous, that we shall run the risk of shortening the description of some other part rather than omit any thing regarding the pelvis.

101. The agreem is composed of five verieters united

together in such a manner as to form a symmetrical triangular mass, situated at the posterior part of the pelvis, fixed between the two osea innominata like a wedge, with its base above articulating with the last lumbar vertebra, and its apex below articulating with the first coocygeal bone; a cunal, named the second round, traverses its whole length from its hase to its apex, and is simply the continuation of the great spinal canal. Viewed separately, and fully importated, it presents an anterior concave, a posterior convex aspect, a right and left lateral edge, a base and an apex. The anterior aspect is smooth, although traversed by four slightly prominent loss, indicating the situation of the inter-vertebral filero-cartilages and the union of the bedies of five vertebrae. Laterally to the right and left, we observe four foraminn (anterior ancrul foramina) large and rounded, but diminishing from above downwards. Outside these foramina is a surface which gives to the sperson its triangular form, being broad superiorly, and diminishing gradually in breadth towards the coccys. The posterior aspect is convex and rough; in the mesial line we remark the redimentary spinous processes, called the Sacral ridge. The lassing belonging to the fifth sacral vertebra seklom unite, thus leaving the spinal canal open, and forming two tubercles, absurdly named the horns of the sacrum; to the right and left of these sacral spines we find superficial channelscontinuations in fact of the vertebral grooves, and bounded externally with a series of slightly marked tubereles, the remains evidently of the articular processes; more externally, right and left, four foramina (posterior sucral). Externally to these foraming we remark a series of eminences strictly analogous to the transverse processes of the vertebras, and still external to and above them will be observed two rough depressions into which are inserted the sacro-iliac ligaments. The lateral aspects are very uneven, bread above and narrow below. A surface of a remarkable form (the facies anricularis), and corresponding to a similarly shaped surface on each os innominatum, marks the powerful articulation with these bones. The remainder of these aspects is rough, and gives attachment to the sacro-sciatic ligaments. The base, we remark,

corresponds precisely to the upper surface of a vertebra, and articulates with the inferior surface of the last lumbar vertebra. It presents therefore a vertebral foramen (the top of the sacral onnal), articular processes, laming, and all the parts common to it as a vertebra. The second is directed downwards and forwards, presents an oval articular surface corresponding to a similar one found on the first energeal home. The rocessgeal boxes are commonly foor in number, and are evidently four vertebras becoming more and more rudimentary. The first, or that which articulates with the apex of the sacrom, presents posteriorly the remains of the articular processes in the shape of two tubercles named horns, and occasionally transverse processes uniting in such a way with the sacrum as to form two additional foramina. The union of the cocevgeal bones with the snerum, and with one another, takes place earlier in the male than in the female-a fact much dwelt upon by the accoucheur. The ostoogeny of the sacrum and coccygeal bones is thus extremely complex, indeed more so than it would at first sight appear. The vertebre all follow one law in their progress towards ossification, and thus we have, in the first place, the elements of nine vertebrae in this purtion of the body, but how are the sacral foraming and broad base of the merum formed? We possess preparations which clearly show that the transverse processes not only unite, but that short ribs are also formed in front of the transverse processes of the three superior sacral vertebrus, which also unite, and contribute to extend the base, and by their union constitute the facies auricularis. By this means the sacral foramina come to be divided into two sets, anterior and posterior; but they are strictly analogous in use, &c. to the foramina conjugalia. These foramina give passage to the spinal nerves of the sacrum, and the bone shews grooves posteriorly, leading from the foramina in which the nerves are situated. The first sacral cortebra bears sometimes the closest resemblance to the last lumbar, and might be mistaken for it, but for the great size and breadth of its lateral processes. Moreover, the buly of this vertebra is slightly convex, whilst the remainder are concave. The sacrum in the

male is comparatively long and straight, in the female broad and curved, but the consideration of its sexual differences fall more properly to be considered in de-

scribing it as a constituent part of the pelvis.

102. Each Os Innowinatus would have, if flattened out, an irregular obling quadrilateral form, contracted in the middle, but it is not only lant upon itself but twisted. In the young person it is divided into three bones by simple maceration in water, and our oldest and best descriptions speak of it as being composed of three bones-thum, ischium, and pubis. The ilium is the uppermost, and forms the margin and prominence of the hannels. The pubis constitutes the anterior part of the os innominatum, and sustains the external organs of The ischium is the lower portion, and generation. more immediately supports the body when seated. The articular surfaces observed in the adult or innominatum are three in number, two of which are not easily recognised by the student. Perhaps the most striking feature of the bone is the deep hemispherical, catyloid, articular eavity for the reception of the head of the femur. The ischium, ilium, and pubis, all contribute in the formation of this cavity,-the ischimn forming rather more than two fifths, the illum less, and the pubis a little more than one fifth. The portions of these three bones, which thus contribute to form the acetabulum, are called their bodies. This cavity has a diameter of about two inches, and is circumscribed by a prominent margin (supercilium), particularly superiorly and externally, a deep notels interrupting it inferiorly. Starting from this envity as a central point. we observe that the bone presents three projecting portions. The largest (the ilium) is, generally speaking, convex externally, and in a well marked bone is traversed by two lines (superior and inferior curved lines). The large convex smooth surface below and anterior to the inferior curved line is occupied by the insertions of the gluteus minimus; the space between the two curved lines give attachment to the gloteus medius, and the gluteus maximus (the most superficial of the (bree) occupies the rough and uneven surface shove and behind the superior curved line. The pertion below the acetabulum is less extensive than that

above, and presents, in the first place, a large foramen-(forance obtaratorism), of an aval or triangular form, the angles being rounded off; the ossnous circumference of this foramen varies from an inch and half to half an inch, and is entirely occupied with the attachment of muscles. The inchium and pubis contribute nearly equal shares in forming the boundaries of the obturator foramen. The abdominal, inner aspect of the os innominata presents, particularly in the female, a remarkable degree of smoothness. Dividing the whole surface into an upper and lower part we remark a concave, broad and rounded line (lines imminate or ileo pectines.) Above this line is a broad but shallow eavity, the iline fisest, and posteriorly a very irregular surface presenting first, an ear shaped space corresponding to a similar one pointed out on the sides of the sacrom and a rough, very irregular surface, to which powerful ligaments (sucro-iliac) are attached. In the division below the lines innominate, we observe the inner orifice of the obturator forumen, behind which is a protty extensive smooth surface of hone, formed entirely by the ischium; whilst anterior to the foramen, we have a smaller triangular and pretty smooth asseous surface, formed entirely by the pubis, the straight inferior margin of the foramen being formed by the union of the descending ramus of the pubis, and the ascending ramus of the ischium. We come now to speak of the edges or margins of this os innominatum. That portion formed by the illum presents a thick convex edge, twisted upon itself like an italic S, passing the finger along this edge or crest (iliac crest), which in the adult female, may measure eight inches in length, it is found rather suddealy to form an angle particularly americaly; this angle is smooth, and constitutes the auterior superior. spine of the ilium, a superficial notch of almost two inches in length follows, which is again terminated by a rounded eminence, the outerior inferior spinous pencess of the ilium. A second deep notels follows this, and which is again succeeded by a rounded consucre-(exchestia ilio-pertines) in which the llium and public unite, proceeding still towards the mesial line, and following the edge of the hone, we find a triangular a wooth horizontal space (horizontal reases of the public), di-

rected obliquely downwards and forwards, and broader externally than towards the mestal line, where indeed it comes to an apax; the posterior edge of this space is thin and sharp, forming a ridge completing the liness innominate anteriorly. The space is an important one in the anatomy of the soft parts, we have said it forms a sort of apex mesially, and just here a pretty distinct and often sharp spine (the spine of the pubis) is formed. From the spine mestally, we observe a rough horizontal surface, extending for about half an inch; this part has received the name of the crest of the pubis, and here the edge we have been following, suddenly forms a right angle, the angle of the pubic, and descends. A rough obling surface first presents itself, an inch and six-eightli deep by six-eighths broad, gradually coming to a point interiorly; this surface by uniting with that of the opposite side, forms the symphysis of the pubis; a thin and sharp crest in the male, blunt and everted outwards in the female, follows this; its extent may be about three inches, the descending runns of the pubis, and ascending of the ischiam unite about its middle; its inclination and form is extremely important: it is terminated inferiorly by an eminence (tuberouity of the ischiam). The direction of our line is here again changed, and we begin to ascend. The tuberosity of the behium, we may remark, presents posteriorly, or as we ascend, a flat rather smooth surface, indicating the presence of a bursa mucosa provided for the protection of the gluteus maximus muscle; a little above this is a grouve in which is occasionally lodged the tendon of the obturafor exterous muscle. Proceeding to ascend, we find a notch (incimra inchiadica inferior, the smaller sciulis sotok,) presenting an almost articular appearance. The tendon of the obturator internus muscle slides over this surface as over a pulley, and it is here where the common public artery is very readily displayed. A thin, pointed, triangular and compressed aminence, having generally an irregular broken appearance follows: this is the spine of the ischium, the anterior sacro-sciatic ligament is attached to its summit. A very deep notch (incirura ischindica superiur, the larger sciatic notch), follows this, which again is limited by a projecting rough eminence, the posterior inferior spinous process

of the ilium, having a broken looking sharp edge; a small notch, and another projecting eminence, the posterior superior spinous process of the ilium, (which with the adjoining large surface is sometimes called the iline tuberosity) succeeds and brings us back to the crest of the ilium, from which we started. The journey is a long one, the objects of attraction numerous, and as the student will find, important. The acctabalane, with which we commenced our description of the surfaces observed on the ussn innominate, receives the rounded head of the femurand these are so nicely adapted to each other that the whole body may be suspended by the limb after all the soft parts and ligaments have been out throughnotch pointed out in its lower part leads to a rather extensive rough surface which is not covered with cartilage in the living body. A quantity of adipose membrane with some fatty bodies called the glands of Havers lie here, and into the centre of the space is fixed a strong inter-articular ligament.

103. The peculiar nomenclature of the casa innomitanta compelled us to begin its description as it were with its esteogeny, we have still to remark on this subject, that several years after birth, an osseous plate is developed all along the crest of the ilium, another embraces the sciatic tuberosity, a third decupies the anterior and inferior spinous process of the ilium, a fourth in the symphysis pubis, a lifth has been seen on the spine of the pubis, and lastly, about the age of eleven, a sixth is observed in the acctabulum just at the point where the three bones unite to form it. The casa innominate present great differences us to thickness, and consequently as to strength at different points. Thus the iline portions are remarkably thin in the iline fosses where there is searcely any diplose.

104. The Pelais must be viewed by the student as a division of the skeleton, and no student of a mouth's standing, should be without one. The position it holds in the articulated skeleton, is different from what the student would suppose if hostudies it separately, in the entire skeleton its figure is that of a conoid, compressed before and behind, and having its two extremities cut obliquely, so as to be always more or less inclined forwards. The upper extremity has an inclination

upwards and forwards, presents laterally the two iline proses, pasteriorly a projecting angle, (the zacro-vertebral angle), anteriorly, an extensive notch, in the centre of which we find the upper part of the symphysis pubes. If we look into the interior of the pelvis, we observe a strait (the upper or abdominal strait), having the form of an ellipse, whose greatest axis is transverse, and whose circomference is interrupted posteriorly by the projection of the sacral promontory; this strait divides the interior of the polvis into first, the great polvis (false polvis) above, and into the small pelvis (true or pelvic exeavation carner) below. The linea innominata and promontory of the sacrum, forms this important strait, which in the well formed female pelvis, ought to have certain diameters. The usual mensurements are asfollows :-

Ist. Antero-posterior or sacro-pubic	4.290 inches.
2dly, Transverse or ilise	5.460 inches.
3dly, Two oblique	4.680 inches.
4thly, Circumference	14.820 inches.

105. The small or true poless is somewhat more capacious than the strait leading to it, its walls generally form smooth planes. It seems to constitute a curved canal, dilated in the middle. Posteriorly, we find the concave surface of the sacrum; anteriorly the symplysis pubis, two smooth osseous surfaces, and the two obturrator foramina; on the sides, the great sciatic notches. The dimensions of this important part in the well formed female, are as follows:—

7.	Height	of the	peaterior w	all	4.836	inches.
2	-	-		·		
3	-	-	lateral wall	*************	3,705	inches.
4.	Thickn	ess of t	he symphys	is pubis	.545	inch.

7. Length of the concavity of the sacrum beneath the arch of the pubes. 4.875 inches

106. The lower extremity of the cosmid to which we have likened the polyis, has received the name of the Lower Strait of the polyis (exitus sex apertura pelsis inferior,) it is directed downwards and outwards. Its form in the skeleton is irregular and difficult to be deter-

mined, because its edges are deeply notched and inclined in two different directions; it in fact presents three large eminences separated by an equal number of deep notches. The scintic unberesities form the two anterior eminences, which are placed wider asunder in the female than in the male, and which descend lower than the posterior and middle emineness, which is represented by the coccygoal bones. One of the notches is placed before, and is named the pubic arch, or arch of the public, it is formed on each side by the descending rami of the pubis, and the ascending rami of the ischium. This triangular space or arch between the bones is wider and shorter in the female than in the male; the apex which is acute in the male is wide and rounded in the female; the edges, moreover, as we have already noticed, are everted in the female, and slarp and straight in the male; an imaginary line running from one tuberosity of the ischium to the other, constitutes the base. Through the upperpart of this triangular space passes the arothm, and there is stretched across it, in the male subject particularly, a strong aftoneurotic membrane through which the urethra runs. At the summit of the arch we have the symphysis pubis, and the arch in the female really deserves the name of arch, measuring as much as an inch and half; whilst in the male, it assumes so much that of the Gothic, as to resemble more an augle than an arch. The other two notches mentioned as being seen in the lower strait of the pelvis, are named the great sciutic sotches, and are each divided into three portions by the sacro-sciatic ligaments, and thus a pelvis with the ligaments is a preparation which every right professional person must possess. The diameters of the peringal aperture are important. and are best taken when the ligaments are present. They are as follows :-

- 3. Oblique......4.290 inches.*

One extremity of this diameter is the centre of the prestor stem-sciatic ligament.

107. From the peculiar manner in which the pelvis is connected to the trunk, the axis of the pelvis differs greatly from that of the budy, and the axis of the entrance into and exit from the true pelvis or cavum also differ from that of the body, and from each other. This face is of the very last importance to the accouchour when called upon to ose the forceps. The axis of the circumference or base of the pelvis cannot be very accurately given, owing to the great deficiency in front, and as it appears to alter much in the reclining or standing position of the budy. In the standing posture a line drawn horizontally backwards from the upper edge of the pubis falls nearly on the last sacral vertehru, and the inclination of the abdominal or superior strait is 35"; whilst the inclimation of the inferior strait will not be more than 15°. The inclination of the upper and lower straits being different, their axis will of course differ also; thus, a line passed in the axis of the abdominal strait will fall on the third coccygeal bone; whilst a line passed in the axis of the inferior strait or exit will strike the sacro-vertebral augle, and these two lines will cross each other about the middle of the pelvic excavation forming unteriorly a very obtuse anele. Thus, whitst the axis of the base of the pelvis is marly vertical, that of the superior strait is so oblique from below upwards and forwards, that a line passing through it would fall upon the umbilicus.

OF THE EXTREMITIES OR LIMBS.

108. The Extremities or Limbs (membra), are appendages of the trunk, and are four in number, dispused symmetrically in pairs, connected to it by one of the extremities, and otherwise free and composed of a series of bones representing contiguous levers, all cut obliquely at their extremities.

THE SUPERIOR OR THURACK EXTREMITIES.

109. The Chaicle or Collar Bose, is placed nearly transversely on each side, at the upper and forepart of the thorax, between the sternum and acromion process of the

scapula, so as to cross obliquely the direction of the first rib. It is twisted in the form of an Italie f, less curred and longer in the female than in the male; prismatic and triangular, or irregularly rounded in its two inner thirds, contracted in the middle, broad and flat at the outer part. The Body or Middle Part is rounded, presenting on its lower surface, at its inner part, a rough impression for the insertion of the costo-clavicular ligament, and at the middle a longitudinal groove, where the hole is observed that gives passage to the nutritions vessels of the bone, and which receives the filter of the subclavius muscle; at its outermost part there is a prominent ridge, running obliquely from within outwards, and from behind forwards, to which are attached the cornerelavicular ligaments. The Sternal or Internal Estecmity is inclined downwards and forwards, and is considerably thicker than the rest of the bone. There is observed upon it a triangular, broad, uneven articular surface, corresponding to a surrow surface, which we have already mentioned as occurring at the upper extremity of the stermon. The Acrowial or External Extremity passes over the coragaid process, and inclines backwards and upwards. It is articulated to the acromion by a narrow articular surface, alslung from helind forwards, inclined obliquely from above downwards, and from without inwards. The clavicle makes its appearance at a very early period in the forms, and commences its ossific development by a single point for the body; but at a more advanced period, when that part has nearly acquired its full size, there is formed at each extremity a thin epiphysis, which ultimately unites with the rest of the bone. It presents two artigular surfaces, a sternal and a scapular.

110. The Scapula or Shoulder-blade, (Omoplates) is situated at the posterior and upper part of the thorax, from about the seventh rib to the first, forming the posterior part of the shoulder. It has a triangular form, and is flat and thin over the greater part of its extent. The Posterior or David Impect is divided transversely into two parts by a flat triangular uninence, situated about its upper thord, manual the Spine. Near the inner edge of the scapula, it proceeds a smooth and polished triangular space, on which the apparence-

sis of the traperius muscle stides. Externally, the spine of the scapula is terminated by a thick and short concave edge, and these two edges uniting, give rise to a considerable eminence named the Acrossion ; flattened in a direction contrary to that of the spine, its soder swrfare is directed upwards and backwards, is convexand uneven, and covered by the skin. The owner surfare is smooth and concave, and inclines downwards and forwards. Its upper odge is directed inwards, gives attachment to the trapezius, and presents anterierly a small oval articular surface, with which the outer extremity of the clavidle is connected. The loweredge is uneven, and gives attachment to some filtres of the deltoid muscle. Its summit affords insertion to the acromio-corneoid ligament. Above the spine is the Form Supra-spinata; below, is the Fersa Infra-spinata, larger than the preceding, somewhat prominent in the middle, but coneave outwards, and upon it a longitudinal ridge, giving insertion to an aponeurosis, common to the infra-spinatus, teres major and minor muscles. Between this ridge, and the axillary edge of the scapula. is a long surface, broader above than below, divided into two parts by another ridge, which descends from that edge, and joins the preceding at an acute angle; the upper and narrow portion of this surface gives attachment to the teres minor; the lower, to the teres major. The Interior or Costal Aspect, is inclined inwards, and concave, forming what is called the Sahadapular Forza, towards the spinal edge of which, are observed, above and below, two plain surfaces, giving attachment to the serratus magnus. The Upper Edge is thin and short, it presents a notch, converted into a hole by the curacoid membrane through which pass the supra-acapular nerve, and sometimes the vessels of the same name. Anteriorly to this notels, a narrow elongated projection, curved upon itself, having always more breadth than thickness, at first possing from below upwards, and presently directing itself from behind forwards, and from above downwards; this projection is named the Cornesid Process, the upper surface of which is convex and uneven, and gives attachment to the coracoclavioular ligaments: the lower surface is smooth and concave. The Spinal or Vertebral Edge, named also the Hare, approaches the vertebral column above, from which it retires at the lewer part. At its union with the upper edge, it forms a projecting angle, which is embraced by the levator anguli scapulas, and which is named the Pasterior, Superior, or Coround Angle. The Duter or Axillary Edge named also the Inferior Casta, inclines downwards and forwards, and is much thicker than the others. It is marked with a grouve into which the long portion of the triceps extensor cubiti is inserted. At its lower part, it receives the teres major; and by uniting with the posterior edge, forms an angle named the Inferior or Cortol, which is thick and rounded; this angle is embraced as it were by the teres major, and is overlapped by the upper margin of the latissimus dorsi, to some fibres of which it occasionally affords insertion. The axillary relige is surmounted by a thick truncated concave and articular angle, named Glewid. This articular surface is superficial, of an oval form, broader below than above; its great diameter is vertical, and a little inclined downwards and outwards; its eigenmerence in the repent state, is surrounded by a fibro-eartilagmon- rim; at its upper part, it gives attachment to the long portion of the biceps musde. It is supported by a contracted part, named the Neck. The development of the seapula takes place by six or seven points of essilication:

11L The Humeras, (On Humeri, On Brachii) is suspended, as it were, to the shoulder, and terminates at the elbow; it is irregular and of a cylindrical form. The Body or Middle Part, is nearly eylindrical at the upper part, becoming prismatic and flattened from before backwards at the lower, and appears as if twisted upon itself in its middle region. Its porterior surface is rounded above, and turned a little inwards, while below it looks outwards, and is broad and flattened. Its. issuer surface is narrow. Superiorly, there is observed a longitudinal depression, covered with cartilage in the recent state, deep above, and gradually disappearing as it desected; this is the divipital grown, lower down, some inequalities to which the comen-brackialis is attached, and the medullary foramen, which is directed from above downwards. At its lower part the hone is rounded, inclines a little forward, and gives assachment in

part to the brachialis internus muscle. Its outer surface is also rounded; but, near its upper third, it presents the deltaid impression, a sort of scabrons surface, and which surmounts a broad and superficial depression, (the spiral groove) inclined obliquely from above downwards and from behind forwards, marking the passage of the radial or muscalu-spiral nerve, and one of the principal branches of the humeral artery. These three surfaces are separated from each other by three promiment lines. The peter, not very distinct at its upper part, is traversed in the middle by the spiral groove of the radial nerve, and becomes very prominent and a little enryed forwards at the lower part, into which the internal intermuscular partition is fixed. The upper or scapalar extremity, is the largest part of the bone, and is formed by three eminences. The upper is inclinish inwards and backwards, of a nearly hemispherical form, is an articular surface, and named the Head. It is supported by a contracted part or Necl. a little longer and more distinct forwards, downwards, and inwards, than at its upper and outer part, where it resembles a mere groove. The axis of this neck is placed obliquely to that of the hone, and forms an obtuse angle with it. The other two eminences are named the greater or smaller tulierusities. The greater is situated posteriorly, is rounded, and presents three plain surfaces. The smaller tuberosity, is much narrower, but a little more prominent. They are separated from each other by the commencement of the hicipital groove, which is directed downwards and inwards. The lower or anti-brackial extremity, is flattened and curved forwards; its transverse diameter is the greatest. At the outside it presents an eminence, named the external condule, into which is inserted the external ligament of the elbow joint. Internally, there is abserved the internal condyle, more prominent than the proceding, turned a little backwards. Between these two eminences is an articular surface, turned forwards, descending below them, and formed from the radial to the ulnur side; 1st, by the Small Head of the Humerus, (superficies articularis realistis), a vounded eminence, which is received into the cavity of the upper extremity of the radius; 2dly, by a grouve which corresponds to the margin of that early; 3dly, by a sharp semicircular crest, which is lodged between the olan and radius; 4thly, by a pulley, superficies articularis ulmris), situated beneath the level of the small head, which articulates with the large sigmoid cavity of the ulna. It is an account of the greater projection of this pulley, that the humerus inclines outwards, when it is placed by its lower extremity on a horizontal plane. At the fore part of this extremity, and above the articular surface, is a superficial cavity, (forse enterior major), which lodges the coronald process of the alm when the fore arm is bent; and at the back part, is observed a deeper fassa, which receives the olegranou when the fore arm is extended. Lastly, above the small head, is a depression, into which the edge of the upper eavity of the radius is received during the forced flexion of the joint. The humerus is compact in its body, spongy and cellular at the extremities, and contains a large medullary canal. It is articulated in the scapula, the radius, and the alna; and is developed by eight points of assification, one for the body, a second for the head, a third for the large tuberosity, a fourth for the small tuberosity, a fifth for the pulley of the lower extremity, a sixth and seventh for such of the condyles. and commonly an eighth for the small head.

112. The Ulas or Cubitus is situated at the inner part of the fore-arm, and although our investigation into comparative anatomy leads us to consider the radius the most important bone of the two composing the anti-brachial region in the human subject, the ulna in reference to the elbow-joint deserves the preference in description. We divide it into a body and two extremities. The body is curved forwards at its upper part. backwards and outwards at the lower, while its middle region is strait. Its anterior surface in concave above, and gives attachment at its upper part, where it is broad, to the flexor profundus, and presents the orifice of a cumal for the passage of vessels into the bone, which is directed upwards. The posterior surface is divided into two parts by a longitudinal prominent line; the inner, which is broader, gives attachment, from almore downwards, to the ancomous and extensor carpi ulmoris; obile the outer, which is narrower, receives, in the same direction the insertions of the supinator brevis, extensors of the thunds and extensor indicis. The inner corface is broad and somewhat concave at the upper part. is cuvered in its three upper fourths, by the flexor profundos y while at the lower part, it is much contracted, and becomes sub-cataneous. These three surfaces are separated by as many edges. The outer is sharp in the three upper fourths of its length, munded below, and gives attackment to the interes-one ligament. The wateraw adge, which is more rounded, gives insertion, at its upper part, to the flexor profundes, and, below, to the promoter quadratus. The posterior edge is very distinet in its three upper fourths, and there gives attachment to an aponeurosis common to the flexor carpl ulnaria, flexor profundus, and extensor carpi ulnaris; it gradually becomes obliterated below. The upper or humeral extremity is large, of an irregular form, and presents for consideration two processes. One of these, the ofergues, (processus asconcus); is situated posteriorly, at its upper part it gives attachment to the triceps extensor; posteriorly, it presents a narrow triangular surface, covered by the skin, which is here provided with a bursa; anteriorly it is conease and invested with cartilage. The other process, which is cannot the coronad (processur coronadeus), is situated before and beneath the electaness; at its apperpart it is eartilaginous and inclined backwards; but helow, it is directed forward, and presents an impression for the httachment of the brachalis muscle. On the inside, it gives attachment to some fibres of the promator teres and flexer sublimis, together with the internal tateral ligament of the elbow joint. Externally, it presents no oval articular cavity, with its greatest diameter from before backwards, usmed the smaller rigmoid cavity, this cavity is articulated with the upper extremity of the radius, and is continued above into the forgor eigmout carrie, which ralls upon the trochles of the lumbsrus, and which is formed by the saterior surface of the oleeranon, and the upper surface of the coronald precess, which units very nearly at a right angle; a transverse line notehed at the extremities indicates the cituation of this amon, the elegranum being an epiphysic in the young subject, and in many cases not forming an esseems union with the body of the hone. Its posterior and vertical portion is larger than the anterior, which is borizontal. The larger sigmoid cavity is divided by a prominent line, which passes from the upper part of the alecranon to the summit of the coronoid process, into two lateral portions, the inner of which is the larger. The lower or carpal extremity is small, and presents two emi-The outer, named the head, is articular and rounded, and received externally into the cavity of the lower extremity of the radius. The inner, or atylaid process, is more prominent, and is placed a little backwards; it is conical and slightly turned outwards; its summit gives attachment to the internal lateral ligament of the wrist-joint. Posteriorly these two eminences are separatde by a groove, in which the tendon of the extensor carpi ulnaris passes, and below by an uneven depression, into which a triangular fibro-cartilage is inserted. ulna is developed by four points of ossification,-one for the body, a second for the electanon, a third for the coronoid process, a fourth for the head and styloid pro-CR55

113. The Radius is situated at the outer part of the fore-arm, and is shorter than the alon; it expands at its lower part, and is slightly curved inwards about the middle. The body or middle part is prismatic and trigonal. Its untersor surface becomes gradually broader as it descends, is plain, in the greater part of its extent concave, and about a third from the upper extremity presents the prifice of the medullary canal, which is directed upwards; the three upper fourths of this surface give attachment to the flexor longus pollicis manus, and its lower fourth to the promator quadratus. Its pastsrior surface is convex, its upper third is covered by the supinator brevis; in the middle receiving the insertions of the extensors of the thumb; and inferiorly covered by the extensar communis digitorum, extensor proprius indicis, and extensor secondi internodii pollicis. safez surface is rounded and convex, gives attachment at its upper part to the supinator brevis; in the middle, where a rough impression is observed, to the pronator teres; and, at its lower part, is covered by the tendons of the radial extensors of the carpus. These three surfaces are separated by an equal number of edges.

of which the posterior is rather indistinct at its upper and lower parts, although pretty physiqua at the middle. The inner is very distinct, thin and sharp, and somewhat arched in the middle, gives attachment to the interosecous ligament. The anterior is less prominent; it is rounded, especially at its lower part, and at its upper part affords insertion to the flexor sublimis, flexor longus proprius pollicis, and supinator brevis; while at its lower part. It receives first the propoter quadratus, and afterwards the suplustor longus. The Upper or lasseral extremity presents a superficial circular articular cavity, into which is received the small head of the humerus. The circumference of this eavity, which is also articular, is broader internally, where it is articulated with the small sigmoid cavity of the ulna; in the rest of its extent, it is connected with the annular ligament. This articular part of the radius is supported by a round contracted seek, about a finger's breadth in length, and inclined a little outwards, terminating downwards and inwards at the bicipital Inberesity, an eminence which is smooth and contiguous externally with the tendon of the biceps flexor, to which it affords attachment internally by a rough surface. The Lower or curpal extranity; is larger than the upper, and presents an articular surface, which is traversed from before backwards by a somewhat indistinct line, dividing it into two articular surfaces, of which the outer is triangular, and of greater extent, the inner square, and less elongated. Anteriorly, this extremity of the bone gives attachment to the anterior ligament of the wrist joint. Posteriorly, it presents two vertical grooves, of which the outer is narrow. passes a little obliquely outwards, and contains the tendon of the extensor secundi internodii pollicis, while the inner, which is broader and superficial, affords a passage to the tendors of the extensor communis digitorum and extensor indices. Internally, it presents an oblong articular cavity, which is articulated to the lower extremity of the ulna; and on the outside is marked with two other grosves, the auterior for the tendons of the extensor ossis metacarpi policis and extensor primi internodii pollicis, the posterior for the tendons of the radial extensor mumbes. The edge by which these grooves are separated terminates below in a pyramidal

eminence, named the atyloid process, which is itself terminated by a blunt amount, into which the external lateral ligament of the wrist joint is inserted. The radius is articulated with the humerus and ulna, and the scaphoid and semilurar hones, and is developed by four points of ossification, one for the body, a second for the head,

and two more for the carpal extremity.

114. The Hand, by referring to our table, (sec. 7,) will be observed to be composed of twenty-nine bonca-(including the two sesumoid bones connected with the flexor brevis of the thumb,) and its subdivision into three regions is essential for facilitating description. The curpul region comprises eight bones, and we would recommend the student to view them in the first place articulated with each other and as a whole; indeed the term curpus is particularly applied to the eight bones thus connected: the carpus is transversely oval, flattened from before backwards, and slightly curved forwards; the posterior surface is convex, and traversed by an unequal depression particularly striking on the tadial margin, presenting a very beautiful arrangement by which a great extent of motion is acquired. The anterior or flexor aspect is concave, showing a much less extent of non-articular surfaces than the posterior. The susphoid and trapezium projecting on the radial margin, and the pasiform and es nuciform on the ulnar margin, and having a powerful ligament. (unterior unwater) attached to them, form a short canal in which the tendons of the flexor muscles of the flagers, together with the nerves and ressels pass. On the radial margin, the curpes forms a semilunar arch, of which a part, namely the central, is articular; the scaphoid and os lunatum here combine to form two articular surfaces pracisely corresponding to these pointed out on the distal or carpal extremity of the radius. It will be now observed by the careful student, that the eight bones are really not arranged in two rows, as most anatomists persist in having it, but as two arches, one within the other, the first composed of five bones, the second of three. The carpus towards the memeurpal bones. presents a sovies of four rather irregular flattened artienlay surfaces, and which support the five metatarsal bones. The pissoem hause supports no metacarpul.

The student must now proceed to examine each bone of the carpus separately, and he will be much struck with their irregular form. We call his attention particularly to the articular and non-articular surfaces. it is an expellent mental exercise, and appears to us the only mode of becoming acquainted with each bane-The non-articulating surfaces will be observed to be few in number, and the most extensive of them will invariably indicate that aspect which looked to the dorsum of the hand, or the radial or ulnar margins. Commencing on the external margin of the carpus, we find, first, the trapezium (or mullangulum magus.) now-articular surfaces observed on this bone are pretty extensive and very irregular. A well marked groove will attract the student's attention; this groove is on the flexor aspect of the bone, and receives the tendon of the flexor carpi radialis muscle. The articulating surfaces are four; the first concave in the transverse direction of the bone, and convex in the opposite direction, (the metacarpal bone of the thumb plays on this surface.) The remaining three are continuous with each other, although lying on different planes; the central one is most extensive, and articulate with the trapezoides; this surface is flanked on the one side by = small and obscurely marked surface, supporting very slightly the second metacarpal hone, and on the other by a well marked concave articular surface for the reception of a part of the Scaphoid home, (or nariculare.) This bone is murly altogether articular; being placed on different planes, however, the articular surfaces are divided into four; the first triangular, playing partly in the surface last mentioned on the trapezium : the second decidedly concave, receiving a portion of the head of the os magnum; the third coavex, corresponding to a similar surface on the radius; the fourth, a narrow, semilunar and ill-defined surface, which however connects the hope with the Semileour, (or headtum, crescent-shaped bone). This bone presents four articulating surfaces. The first corresponding to the one last mentioned on the scaphaid, is similar in form and will scarredy be recognised as having been articular; the second well marked suncave, reserving the greater portion of the head of the or magnum; the

third extensive and convex, connected to the radius; the fourth flat, and rather quadrilateral, connecting this bone with the Consiform (or triquetrum, pyramidal). This bone presents three articular surfaces; the first. flat, corresponding to that last mentioned on the semilunar; the second, irregularly concave, articulating with the unciform bone; the third, a circular slightly convex surface, supporting entirely the Pinform Bons. bone is nearly rounded excepting on one portion, viz. the only articular surface which it presents; this surface is circular, slightly concave, and corresponds exactly to that last mentioned on the cunciform house. thus complete what we consider the superior arch, and the three remaining bones will be found to fill up this arch; two of these bones are nearly equal in size, and are easily recognised, proceeding from the ulnar side, we shall select the Unriform Bose, so named from a hook-like process which it presents on its anterior aspect. We observe three distinct articular aspects; the first irregularly quadrilateral, but twisted on itself, having a very slight ridge traversing it; this surface corresponds to two bones, viz. caneilorm entirely, and semilunar partially, the play bring very considerable in the movements of the hand from side to side; the second articular surface presents an obling square aspect divided into two unequal parts by a superficial ridge, these supportnearly entirely the fourth and fifth metacarpal bones; the third is a flat and nearly circular surface upon the same plane with which we observe an unevennotched surface; these correspond precisely to a similar aspect presented by the Os Magnam. (or capitation). This bone is the largest of the carpus, and is readily distinguished from the others by having a rounded articular head; we observe on it four articular surfaces; first, an extensive flattened surface, partly articular, and corresponding very accurately to that last pointed out on the unciform; the second, the rounded head, which is received into a concave surface, formed by the scaphoid and os lumatum, (and it is in this situation, no doubt, that most. of the delicate movements of the wrist mint are performed); thirdly, an extensive surface divided into four purtions by three elevations; the most extensive surface suppairs the third metacarpal bone; the second in extent

supports a portion of the fourth metacarpal bone; the next in extent touches the second instararpal; and lastly, a surface which we observe to be continuous with the rounded head, supports the Os Trapezoides (os mullangulum minus.) This is perhaps the most difficult bond to recognise in the carpal region, but if the student leaves it to the last as we have done, he can have little difficulty; for curselves, we think it an easily recognised bone, if the surfaces are contemplated as we have already recommended. The articular surfaces presented are four in number, contingous with each other, but lying on different planes; first, that articulating with the os magnum is clongated, concave, the concavity being produced as it were by a twist given to the bone; secondly, an clongated pretty extensive surface, decidedly convex in its short diameter, this supports the second metacarpal bone; thirdly, a well marked, flattened, slightly convex surface, articulates with the trapezius; and lastly, a narrow quadrilateral facet contributes to form a surface: in which the scaphoid performs very extensive movements. The development or ossification of these eight hones is slow, commencing at a late period of the fortal life, and not completed for a very considerable period after birth. In this respect they resemble strongly the nature of the epiphyses of the long bones; and a section shows a still more striking resemblance, the interior being spongy, the exterior a very thin layer or compact tissue, the non-articular surfaces perforated with many openings, and no medullary cavity. The pisiform hone is not completely ossified until ahout threlve years of age. They are all, so far as can be observed in the human subject, developed from one centre of ossification, except the unciform which has two.

115. The skeleton of the metacorpus consists of five clongated hones, resembling each other in many respects. The extremities are thicker than the centre, and are articular; the proximal extremities are nearly flat with the exception of the first, and of course perform very limited metions; the distal or metacorpo-digital extremities present a rounded condyloid head, admitting of flexion and extension of rather more than a semicircle, and even of a slight rotation, although we shall find strong lateral liguments. When viewed in the articulated skeleton, it will be observed that the first is placed on a plane, anterior to the remaining four, and its movements are much more extensive; it differs also in form. Anteriorly, they are all decidedly concave; posteriorly, convex. The anterior aspect presents the appearance of a median line, flattened out towards their proximal extremity; the posterior surface also presents a median line, but which commencing near their prosimal extremity, bifurcates, forming ultimately the sides of a flat triangular surface; Into the ridges thus formed, we have inserted the interconcei muncles. The that triaugular surface on the posterior aspect, and the ridge anteriorly forming prominent features in a deeply dissected hand. We distinguish these bones from each other by attending to the proximal articular surfaces. The first is concave in one direction, convex in the other; it is supported upon a similar surface pointed out on the trapezius, and being placed on a plane auterior to the other fingers, can easily oppose each in all the motions of flexion. The proximal extremity of the accord is divided by two ridges presenting in the centre a deep notch into which a curresponding ridge of the trapezoides passes, the bone also articulates with the trapezius, os magnum, and with the third metacarpal hone. The preximal extremity of the third metagarpal is nearly flat, and supported altogether on the os magnum; towards the ulnar side we observe an articular surface slightly notched in the centre, corresponding to a similar surface on the fourth metacarpal bone. The proximal extremity of the fourth metacarpal is divided into two unequal parts by a ridge, the largest articulating with the unciform bone, the amallest with the os magnum; on the ulnur side, a flat canenve surface corresponds to a similar one observed on the fifth metacarpal hone. The proximal extremity of this bone presents a flattened surface, articulated with the os unciform, on the ulnur side a projecting heel to which the extensor earpi ulmaris takes an attachment. The ossification of these bones is interesting, and has received a great share of our attention. In the child, and in some rare instances in the adult, we find the body and proximal extremity of the wood, third, fourth and fifth as one bone, whilst the distal extremity presents an epiphyses, and the arriking pscallarity is, that this order is reversed with regard to the first on that supporting the thumb; this fact has but many good matomists to consider it wit as a memerical bone, but is a postyra whose progress of emitted on more to follow the same law. The trust is, that these bones have all an epiphyses at each extremity like the other long bones, but their union to the budy follow different laws. A case of emgenital delicinity now before as, proves mearly to a demonstration, that it is the middle phalynx of the thumb which is always wanting.

116. The sheleton of the fingers is composed of fourteen phalanges, each inger having three except the thumb which has only two. The posterior (dorsal) surface of all the phalanges is convex and slightly arched; the anterior (palmar) surface is also arched, but from before backwards, bollowed from side to side, the sheath of the flever tendons being attached to its edges, and thus constituting a semi-osseous semi-aponeurotic canal for the play of these powerful tentions. Viewing the whole from the radial to the ulpur aspect, we observe they are arranged in rows, a pruximal; a middle, and a distal-The finger tapers from its proximal to its distal extremity, and although it would be difficult to distinguish one phalanx of the same new from another, yet the bones of each row are easily distinguished. The proximal row, five in number, present each on their proximal gatesmity a hollow articular articular surface for receiving the mand condyloid head of the currespunding metacorpal bone, whilst the distal extremities are surmounted by two combyles, separated by a groove more prolonged anteriorly than peneriorly, and corresponding with the proximal and of the widdle phalanges. The middle true of phalanges are only four in number, the first or though wanting this bone. The presimal extremities of these, present two lateral depressions with a central elevation: the distal extremity again, is not untifice that of the proximal phalanges, so that the form of the proximal extremities forms the only guide to recognise them. The distal plantanger, five in number are very peopliar; they support the sail, and that nervous auchion amountifuling the most delicate part of the sense of teach;

their distal extremity is rounded, compressed, tuberenlar, and broader than the body; their proximal extremity presents two cavities with a central eminence ourresponding to the distal extremity of the middle phalyny. The thumb in man has a strength poculiar to himself, and the want of a phalynx causes no deficiency in its usefulness; at the metacarpo-phalangeal articulation, and on its anterior (palmar) aspect, we always have two bones named sexumoid, provided aspecially for the more advantageous play of the flexor brevis muscle; they are connected to the other hones by strong ligaments, and are developed in a fibro-cartilage; they are in every respect similar to the pisiform bone of the carpus or the patella in the knee-joint, all of which have the strongest analogy to the epiphyses of long bones. The ossification of the phalanges proceeds as in the metasarpal bones from three points, but in them the distal epiphyses unites at a very early period with the body. The distal phalanges, or those supporting the nail cosify from two centres only.

THE INFERIOR OR PELVIC EXTREMETERS.

117. The Fewer is the longest, largest, and heaviest bone of the skeleton; it consists of a body and two artigular extremities. The body, which is pretty thick above, contracted in the middle, and greatly enlarged below, is slightly twisted upon itself, and presents a yery distinct curvature, of which the convexity is anterior. It is somewhat triangular in its three upper fourths, and is flattened from before backwards in the lower fourth. Its unterior surface is convex, broader above and below than in the middle, and slightly twisted upon itself. The outer surface is narrow, slightly concave above, convex below. The inner surface is broader than the preceding, nearly plain, and covered by the vastos internos, to which it gives attachment in its two upper thirds. These surfaces are separated by three edger, two lateral, rounded, rather indistinct; a third, posterior, very prominent, rough, and furnished with distinct asperities, has received the name of lines namers. This line, whose direction is parallel to the axis of the bows, is much more distinct at its middle

part than at the extremities. It has besides a certain breadth, and presents two lips or edges, separated by an interval, and retiring to a great distance from each other at the upper and lower parts of the bone, which makes it appear bifurcated at its two extremities. It gives attachment externally to the vastus externus and the short head of the biceps. Internally, it receives the insertion of the vastos internus; while its middle part receives a portion of the fibres of the three adductor muscles of the thigh. The external branch of the upper bifurcation of the linea aspera ascends to the trochanter major; it is very rough, and gives attachment externally to the vastus externus, internally to the adductor magnus, and in the middle to the tendon of the glutous muximus. The internal branch is not very distinct, passes upwards and inwards to the trochanter minor, and gives attachment to the pretineus and vastus internus. The quadratus femoris and adductor magnus cover the triangular interval existing between these branches. The branches of the lower bifurcation of the linea aspera are longer than those of the upper; they descend toward the posterior part of the condyles, above which they terminate by very distinct impressions, and are more widely separated than those of the upper bifurcation. The external branch, which is more prominent than the inner, affords insertion to the vastus externus and biceps flexor muscles; the internal, which is depressed at its upper part, and even almost entirely offaced toward the middle for the passage of the femoral artery, which runs across it, gives attachment to the vastus internus and adductor magnus. These two lines are separated by a triangular flattened surface, which corresponds to the poplifical vessels and nerves, and is limited at its lower part, and laterally by rough impressions, which are placed immediately above the posterior extremity of the condyles, and which give attachment to the tendone of the gastrognemius externus musels. The appear or privic extremity is angularly curved from its union with the body of the bone, and of a very irregular form, presenting three large processes. One, the head, is articular, of a spherical form, and directed obliquely upwards, inwards, and a little forwards. At the mid-

die, or a little below it, there is an uneven depression, which gives attachment to the cound ligament of the hip joint; it is supported by a long week, which forms a more or less obtuse angle outwards with the axis of the body of the bone. It is longer and smaller below and behind, than above and before. The head is separated from the neck by a variously amounted line. which corresponds to the circumference of the cartilage by which the head is invested; two other broad and sentrous lines, directed obliquely inwards and downwards, praceeding from the great to the small trockenter, and situated the one before (linea intertrachanteries asserior), the other behind (linea intertrockauterica pararriar) the base of the neck, indicate its junction with the body of the bone, and give attachment to the capsular ligament. The part of the nock which is next the head, is rounded and smaller; in the rest of its extent, it has the form of a triangular prism, with very blant angles. The second process is named the great -truckingley, and is a broad, thick, rough, quadrilateral eminence, flattened from within outwards, siteated at a lower level than the head. It is broad and convex; externally the tendon of the glutens maximus plays over it, having a synovial bursa interposed. It is terminated below by a rather prominent ridge, which gives attachment to the vastes externus muscle. Its inner surface presents at its upper part an irregular depression, named the digital early, into which are inserted the tendons of the pyriformis, superior and inferiar gamelli, obterator internus, and obterator externus muscles. The autorior relac of the great trochanter is broad and rough, giving insertion to the tendon of the glottens minimus. Its posterior edge receives the tendon of the quadratus femoris. Its awayit is short, thick, and very rough. The mull-trochanter is situated beneath and behind the base of the neck of the femur, and much lower than the great trochanter; its form is syramidal, and its direction obliquely inwards and backwards. From its bese, which is triangular, there proceed three prominent lines; two superior, of which the one assemts ubliquely entwards to the great truchanter, while the other proceeds oldiquely inwards, to be continued into the lower part of the neck; and one

inferior, which directs itself toward the linea asperaand forms the inner branch of its asperior bifurcation. The lower or tibial extremity is larger than the upperflattened from before backwards, and thinner in its middle part than on the sides, which are formed of two considerable eminences, named outdyles. There condyles articulate with the tibin, and are distinguished into internal and external, being separated posteriorly by a deep noteh (the force interconduction posterior), whilst anteriorly their articular surfaces are continued into each other, forming a pulley (the force interiordubidea naterior); their form is convex from above downwards, coprave transversely, more prominent and higher externally than internally, the outer condyle farming nearly the whole of the articular surface. The internal condule is narrower, less prominent anteriorly. more oblique, more prolonged backwards than the other, and also descends lower when the femur is placed in a vertical direction, but remains on the same level with it when the bone is restored to its materal obli-Internally an uneven projecting eminence, named the internal inherosity, gives attachment to the internal lateral ligament of the knee-joint, and to the tendon of the adductor magnus. The outer condyle presents externally the external tuberusity, oneven, rough, convex, and giving marchment to the external lateral ligament of the knee-joint. Beneath this tuberosity, there is observed a grouve, which receives the tendon of the poplituus muscle in the flexed position of the joint. The femur in a feetus of about the fourth month, now before us, presents the appearance of a eylinder, terminated at each extremity by a cartilage, which includes superiorly the head, neck, and both trochanters, and inferiorly the condyles. In the young person, say about seven, and in some cases throughout life, unmeration will separate the femur into five portions, viz. Ist, the body : 2st, head; 3d, trochanter majury 4th, and minur; 5th, condyles. A longitudinal section of the adult femur exhibits an extensive modullary canal, compact tissue of great thickness and strength where the canal is most distinct, becoming papirations towards the extremities, where the contre of the bone is companed of cancelli. The canal for

the passage of the meduliary artery commentes in the line of the linea aspera, between the upper and middle third of the bone. The extremities of the bone are also perforated by innumerable minute openings

for the passage of vessels.

118. The Tibia is the largest and longest of the two bones of the leg, of which it occupies the inner and fore part. The body is prismatic and triangular; its thinkness diminishes from the upper part to the lower is a general manner, but the place where it is smallest is below the middle third. Independently of its being twisted upon itself, it presents a double curvature, which is such that internally its two upper thirds are slightly convex, while the lower is a little concave. Its inner surface is directed obliquely forwards, convex, and broader above than below, is covered at the upper part by the tendimous expansions of the sartorius, gracilis, and semitendineous muscles, while in the rest of its extent it lies immediately under the skin. Its ower surface, which is also broader above than below, is concave in its two upper thirds, where the tibialis antieus is inserted, and convex in the remaining third, which is covered by the tendons of that muscle, of the extensor communis digitorum, extensor proprius pollicis and peronees tertius. Its pasterior surface is also broader above than below, and convex in its whole extent. Its upper part is traversed by a prominent line. which directs itself obliquely downwards and outwards, giving insertion to the poplitous, soleus, tibialis posticas, and flexor communis digitorum pedis. The portion of the posterior surface of the tibia which is situated above this line, is of small extent, of a triangular form, and covered by the popliteus muscle: that which lies beneath it, being of greater size, is covered by the tibialus posticus and flexor longus digitorum, to which it gives attachment. These surfaces are separated by three edges. The anterior edge (creat) is more promiment at its middle part than above, and especially than at the lower part, where it is counted and disappears attogether, is twisted like the budy of the bons, and gives attachment to the aponeurous of the leg. The issuer edge is thick, rounded, more distance below than above, where it gives attachment to the internal lateral liga-

ment of the knee-joint. To this edge are also attached the poplitous, soleus, and flexor longus digitorum pedis. The outer edge (interescal,) is thin and sharp, and gives insertion to the interesseal ligament; it is bifureated at the lower part. The upper or femoral extremity, which is larger than the lower, is transversely oval; presenting superiorly, two concave articular surfaces, corresponding to the posterior parts of the articular surfaces of the condyles on the distal extremity of the femur. The inner, which is deeper than the other, is of an oral form from before backwards. The outer, which inclines a little obliquely downwards and outwards, has a nearly circular form. A pyramidal process, with a broad base, inclined obliquely upwards and inwards, surmounted by two tubercles, situated at a greater distance from the fore than the bock part of the hone, and named the spine of the tibia, separates these two articular surfaces, and presents anteriorly and posteriorly two uneven depressions. The upper extremity of the tibla is limited anteriorly by a triangular, somewhat convex surface, directed obliquely furwards and downwards, presenting a great number of vascular apertures, and at its lower part a tubercle to which is attached the ligamentum patells. Posteriorly there is observed a more or less sleep notels. On the sides two considerable eminences are met with, which are named the tubercuities of the tibia; the inner is larger and more distinct than the outer, gives attachment to the internal lateral ligament of the knee-joint, and posteriorly to the tendon of the semimembranesus muscle. outer presents at its back part a small rounded articular surface, somewhat convex, nearly circular, directed downwards, articulating with the upper extremity of the fibula. The force or torsal extremity has a nearly quadrilateral form, and presents anteriorly a bresulconvex surface, which gives attachment to ligaments. Posteriorly, there is observed another surface, nearly plain, but traversed by a superficial groove, in which slides the tendon of the flexor langua poliicis pedis; at its lower part it also receives insertions of ligaments. To the outside is seen a concave triangular surface, rough above where a ligament is attached to it, broad, smooth, and polished below, to be connected with a si-

milar surface of the lower extremity of the filmla; it is at the summit of this surface that the outer edge of the body of the tibia terminates. Internally there is seen a thick triangular progess, the sualleolus interuns, directed downwards, and flattened from within outwards. It is not placed in the same plane with the internal tuberosity of the tibia, but is a little anterior to it, which appears to depend upon the twisting of the body of the bone. This process is convex and subentaneous internally; externally it presents a small triangular articular surface, which unites nearly at a right angle with the lower articular surface of this extremity of the tibin, and is connected with the astragalas. Anteriorly and posteriorly, it is terminated by two thick edges, of which the anterior is convex, and gives attachment to ligaments, the posterior marked with one, or sometimes two superficial grooves, directed downwards and inwards, in which slide the tendors of the tibialis posticus and Hexor longus digitorum. The summit of the mullcolus internus is broader, and descends less behind than before; it gives attachment to the internal lateral ligament of the ankle joint. Inferiorly, the tarsal extremity of the tibia is terminated by a concave quadrilateral surface, broader externally than inwards, separated into two parts by a very superficul prominence which transverses it from before backwards. This surface, which is limited internally by the external surface of the malleolus internus, and externally by the notch which receives the lower extremity of the abula, is articulated to the upper surface of the astrogalus. The tibia in the fortus now before us presents a dylindrical appearance, terminated at each extremity with a very extensive cartilage, that on the superior extremity includes both tuberosities, the tuberele, and consequently the ligamentum patellie, with a cartilage representing that bone, the lower surface includes the whole of the malleolus internus, and that portion which articulates with the fibula; in brief, all the articular surfaces. Maceration will divide the bone of a young person; and in some cases, that of an adult into three parts. In the adult bone, the entrance of the canal for the passage of the medullary artery, is placed in the posterior surface between the upper and middle third, and

a section exhibits a very extensive medallary canni, and a similar arrangement of the osseous texture with the female.

119. The fidula (perone) is a bone placed externally to the tibio, and the student finds difficulty in learning it, owing to its irregular form; and indeed it is not easy to got a well-marked bone. The one before us is lifteen inches in length, with a distincter of §, the extremities broadening out, give a measurement of along an inch. -weight 2) ounces. The proximal extremity (head) is rounded, presenting a concavity inclined inwards and forwards, in which there is a rounded articular facet, corresponding to one pointed out on the external tuberosity of the tibia. The whole surface is rough, giving attachment to ligaments, and is surmounted by a small pyramidal process. Leaving this extremity. the hone becomes contracted and rounded, forming what surgeons call the seck, and the most striking feature we now observe, is a sharp ridge running in the axis of the bone, which, after a course of about 41 inches bifurcates. The internal division runs towards a rough surface, which is connected to the tibia, whilst the external division, after a course of about 5 inches more, again bifurcates, including a triangular surface of about 21 inches in length, which in the living body is covered only by integuments, looks outwards and forwards,-thus we have the ridge terminating inferiorly in three divisions; the centre division should be considered by the student attentively, it forms the true continuation of the ridge, as throughout this whole line the interesseus membrane is attached to it; dividing the hone into anterior and posterior surfaces, external and internal margins. The upper half of the hone presents other two edges not so sharp as the one we have just described. One external and anterior, named the crest, is lost about the middle third of the bone, which becomes smooth, leads to a groove at the inferior and external extremity of the bone; this groove lodges the tendom of the persona muscles, and lies just behind the triangular subcutaneous surface already alluded in; superiorly between these two ridges the extensor muscles are attached. The third and last ridge is on the posterior aspect of the bone, it is

well marked, until about the lower third of the bone where it is last, or becomes continuous with the first offset from the internal or inter-assegus ridge. The interspace where both these ridges are particularly well marked, we observe a very distinct concavity in the longitudinal direction of the bone, to which surface the tibially partieus is principally attached. The lower or tarsal extremity of the bone is flattened from within outwards, and terminated by a pointed pracess inmiwhich the internal middle lateral ligament is fixed, it forms the outer ankle, which is larger, and descends lower than the inner ankle. The external surface the student will recognize us the sub-cutaneous triangular surface already so much dwelt upon. The internal surface presents, first, a triangular articular facet articulated to the astragalus; secondly, a rough well marked depression into which the posterior external ligament of the ankle joint is fixed; the edge dividing these two surfaces is rather thin, but rough anteriorly for the insertion of ligaments, posteriorly it equals six-nighths in breadth, and presents the groove for the play of the lateral peronef muscles. The fibula in the feebus new before us, presents a cylindrical bone extensively cartilaginous at each extremity. Maceration separates it in the young or scrofulous person into three parts, viz. 1. the body. 2. A portion, including the upper and articular part of the head. 3. A portion including all the articular part of the malleolus externus. The medullary artery penetrates the bone between its upper and middle third, its course is from above downwards, a section of the bone shows a medullary canal proportioned to the size of the shaft,

120. The Patella (Retala), occupies the anterior part of the knee. Its form is that of a triangle rounded on the angles. Its anterior medice is convex, uneven, covered with a great number of small vascular apertures and longitudinal strice, which indicate the direction of the fibres of the hone: it is covered by tendinous and aponeurosis expansions, by the skin and subentaneous barsa. The pasterior surface is separated into two portions, by a prominent lane which descends obliquely inwards from the lone of the bone towards its lower angle. Of those two portions, the outer is larger

and deeper than the inner, in conformity to the disposition of the articular part of the corresponding condyle of the femor. Beneath them is seen a small triangular rough surface, into which is inserted the ligament of the patella. The base of the patella is thick, directed apparels, and cut obliquely downwards and forwards, gives attachment to the tendon of the rectus femoris. Its two lateral edges, which are thin, issuvex, and prominent, receive apparences from the triceps extensor. Its summit is sharp and directed downwards. Nirmiters. The patella is almost entirely formed of very dense colladar tissue, traversed by longitudinal bony fibres, and covered with a very thin layer of compact tissue. It ossifies from a single centre, and remains long cartila-

ginnus.

121. The Foot is composed of twenty-eight bones (including the two sesamoid bones connected with the flexor brevis of the great too), and is divided into tarsal, metaturani, and phalangeal regions. The turious in the human subject is composed of seven bones, They are all, strictly speaking, short hones; have no medallary cavity, but are internally entirely composed of a close concellated lamine covered externally with a thin plate of the compact texture. Their arrangement in the human foot when well formed, (and there are great differences in this respect,) yields in beauty and perfection to no part in the human body. This part of the skeleton seems indeed perfected in man, The seven homes are pretty nearly arranged in three tows, of which arrangement the surgeon avails himself in performing the partial amputation of the foot. The Astrogulus (talus) in form is exceedingly irregular, but it may be at once recognized by its articular surfaces, which are numerous. The tibial aspect is pulley shaped, broader towards the extensor aspect of the himb, and traversed by a shallow groove, corresponding to the extremity of the tibia; this articular surface is flanked by two others of a triangular shape, the smallest of these two triangular articular surfaces articulates with the malleolus interpus, which the student will remember is a process of the tibia, the other or fibular is of a decided triangular form, corresponding to the malleolus externus; these curfaces are all articular and

continuous, but lie on very different planes. The scaphoid articular surface of the astragalus is rounded, and hope called its head or copied; set of from the other part of the lune, on a round contracted rough nick (collaw), and articulated with the or naviculare or scaphoid. The calcaneo-articular aspect of the astragulas is divided by a very distinct weigh groove, into which are inserted powerful ligaments connecting the astragulus to the us calcis, and which may in fact he called inter-articular, being and unlike the crucial ligaments of the knee joint; of these articular surfaces, one is concave, the other curvex, traversed by a very superficial ridge, and becoming coutinuous with the scaphoid articular surface. The Ox Calcia (calcaneaux) is of an elongated square form slightly compressed on each side. Its articular surfaces are two in number,-viz. astragalo and calmid. The astruralo corresponds precisely to the surface we have just described on the astragalus; it is divided by a deep rough groove, into which powerful ligaments are inserted; one of these articular surfaces is broad and convex; the other is narrow, oblong, and slightly coneave, and is formed upon a projection of the bone called the small process, into which the internal lateral legament of the ankle joint is fixed. The culoud aspect se a concave articular surface, supported on a rough contracted projection of the bone, and called the great process of the calcangers. The plantar and flexur aspect of the hone is rounded and narrow, the one extremity of which is convex in all directions, smooth, and as it were polished where a bursa allows the tends Achillis to play over it, and close to the plantar surface prosenting inequalities marking the point of insertion of de tendo Achillis. Two tuberusitles affording insertions for the superficial noiseles of the sale of the foot. and the surface still contracting terminates by a rough televele, into which is inserted the inferior enleanerseapheid ligament. The inner aspect is a broad concave surface, forming an areli when the plantar aspect is placed on the ground, by which means the tendon of the flaur langus digitarum pedis, tibialis posticus, and flexor longus pollicis pedis, reach the plantar sapers of the fast. The tendon of the Haxar longus pollice podi-

passes in a very distinct groove occupying the upper part of this surface, immediately under the small process. and also seen partially on the posterior part of the estra-The abular aspect presents two superficial grooves, suparated by a spine into which the external lateral ligament of the ankle-joint is fixed, whilst in the grooves play the tendons of the lateral peronei muscles. The greater part of this surface is subcutamenus, terminating in the great process of the calcaneum where slight inequalities mark the insertion of the extensor brevis digitorum pedis. The Ox Naviculare, or Seaphoides tarsi is on the tibial margin of the foot, and is one of the two tarsal bones, forming, as it were, the second of the three rows into which the whole tarsas has been divided by practical surgeons; it is of an oval form, and has articular surfaces, astragalo and cuncen-The articular surface for the astralagus is concave, articulating in a strong and peculiar manner with the head of the astragalus; the cancen aspect presents a convex surface, divided into three facets, by rather indistinct angular lines. The non-articular surface may he called the circumferences of the bone, upon which a small articular surface may sometimes be observed for a corresponding articular surface on the as cuboides. Its plantar and internal aspect presents a prominent rough tubercle, into which the tendon of the tibialis posticus is inserted. The Os cuboides is on the fibular margin of the foot, and completes, with the pavicular bone, the second row into which the tursal bones have been divided. Its articular surfaces are three in number; calcaneo, metatarsul, cuneen. The first (enfouse) is slightly concave. The second (metatarsal) is divided into two by a transverse ridge, one square, articutates with the fourth metatarsal bone, the other distinctly triangular, and placed on the fibular margin of the foot articulating with the fifth metatursal bone. Ligaments are attached to the greater part of its non-articular surfaces; on its plantar aspect we observe an eminence, to which is attached the inferior calcancocuboid ligament, and close to this a groove, in which plays the tendon of the perspens longus museles. The external margin is short and narrow, the internal maxgin presents an articular facet for the external cunciform bone, and in some cases a very indistinct surface where it touches the seaphoid. The Our Cussiformia are three in number, all wedge-shaped, contributing greatly in the formation of the arch of the human foot, they are placed on the tibial margin of the foot, and we shall distinguish them most readily by an attentive examination of their articular surfaces. The First (internal and largest) cunciform bone, has three articular surfaces; navienlar, metatarsal, and concern. The pavicular articular surface is triangular, smooth, concave, correspossiling to the first of the three facets described on the navicular hone; the metatarsal present two articular surfaces not divided, but placed at right angles to each other; one at the extremity of the bone has a crescent form, to which the first metatarsal hone is articulated, and connected with the ponvex edge and at right angles with it, we find the articular surface perfeetly continuous, and presenting a surface articulated with the second metatarsal bons. Upon the same aspect of the bone, and divided from this by a rough depression, we observe another smooth flat articular surface connected with the middle canciform bone. A leading feature, however, of this canciform bone is, that one entire aspect of it, and that large and flat, is non-articular; this surface is subcutaneous, and distinguishes the bone at once from the two following caneiform hones. The convex rough surfaces which we know to form its plantar aspect, gives attachment to the tendon of the tibialis antieus, and to a portion of the tendon of the tibialis posticus. The Second (smallest,) cureiform howe, presents the form of the most perfect wedge. It has four articular surfaces; a navicular, corresponding to the middle facet pointed out in describing that bone; an articular surface corresponding very accurately with the proximal and of the second metatarsal; a rough flattened irregularly articular surface, correspending to that pointed out on the internal canciform t and a similar aspect, but presenting a very limited extent of articular surface meeting one on the Third (external) saveiform home. The corresponding articular surface on this bunn is of very limited extent, the rough depressions giving attachment to powerful inter-articular ligaments; un extensive flat articular surface sunports the third metatarsal bone; a broad, partly articular surface, corresponds to the cuboid, and by a surface altogether articular, but the smallest of the four surfaces corresponds to the external facet polaried out on the pavicular bone. The entirely somerticular surfaces of these canciform bones gives the student the key for secretaining to what foot they belonged, the more extensive surface indicating the dorsum of the foot, the narrow wedge-shaped surface indicating the plantar as-

peet.

122. The Metatorius consists of five bones resembling each other a good deal in general form. They are all, properly speaking, long bones, although in man they are actually not above two inches and three-fourths in length, and little or no medullary cavity found in the interior. Yet their mode of development is precisely similar to the long bones. We shall describe them, and reeoguise them by their articular surfaces. They are all slightly concave towards their flexor aspect; they have a body and two extremities both articular. The first (Os Metatarri Pollicis Pedis) is comparatively large, and presents, on its proximal extremity, a cresent shape slightly concave articular surface, articulated with a corresponding surface on the first cunciform, and towards the plantar aspect of the bone, we observe a tuberele into which the tendan of the peroneus longus is inserted. The body of the bone presents three ridges running in its axis, to which a strong aponeurosis enveloping and giving attachment to muscles, is fixed. The distal (phalangeal) extremity is an oblong rounded surface, improperly termed head, (capitalum); at each side of this oblong articular surface are impressions for the attachment of lateral ligaments. Towards the plantar aspect of the bone, a prominence running in the axis of the bone, divides the articular surface into two parts, assunting the appearance of depressions, and on which two assamoid hones play, as connected with the flexor museles of the great toe. The record Metatarzal Bane prosents on its tursal extremity a triangular surface, slightly concave, articulating with the second convitors bone, and as the second cuneiform bone in the articulated foot, is shorter than the first and third, in its antro-posterior axis the second metatarsal gets jummed in between the first and third conciform bones, and is articulated with the whole three; accordingly, continuous with the proximal arricular extremity, but at right angles to it, wa observe on its inner margin a single flat articular surface, corresponding to a similar facet on the first canciform; and on the opposite or external aspect a linear facet, connecting it with the third concilorm hone, and two distinct articular surfaces (having a depression between them for the attachment of ligaments) corresponding to two similar surfaces on the inner margin of the third metatarsal bone. The convex or dorsal aspect of the bone is rough and broad near its tarsal extremity, gets narrow about the middle, and is traversed by a ridge into which a strong aponeurosis is attached, dividing and giving attachment to interessei muscles. The phalangual extremity of the bone is articular, convex, transversely compressed, more extended on its plantar aspect; depressions on each aide of this articular surface show the situation of the lateral ligament of the joint. The third Melotaraul Bour presents on its tursal extremity a triangular articular surface, articulating with the third cuneiform bone, and a good deal resembles that of the second metatarsal bone; continuous with this extremity, but on the inner margins of the bone, we observe two small articular surfaces nearly divided by a rough depression articulating with corresponding surfaces on the external margin of the second metatarsal bone. On the fibular margin, a single concave articular surface connected with a similar facet on the fourth metatarnal linne. The dorsal aspect of the bone, and the phalangeal extremity exactly resemble the second metatarsal. and the only distinguishing marks of this bone is the position of the lateral articular facets on its proximal extremity. The fourth Metatarzal Bone presents on its tarsal extremity a cubical form, having a square slightly concave surface, articulated with a corresponding facet on the os cuboides; continuous with this, but on the inner margin of the bone, we observe two articular surfaces, the one very narrow articulating with the third consiform hone, the other larger and convex articulating with a corresponding faces on the external margin of the third metatarsal hone. The body and phalangeal extremity exactly resemble those of the second and third

inetatursal bonus, and the enhical shaped articular tarsal extremity forms its only distinguishing mark. lifth Metalorual Hose presents on its tarsal extremity, which is of a pyramidal form, a triangular convex surface, articulating with a corresponding facet on the us cuboides, and continuous with this, but on the inner margin of the bone, a concave surface, articulating with a corresponding facet on the external margin of the fourth meratarsal hone. On the external margin we abserve a very prominent tuberele to which are attachest (besides ligaments,) the tendon of the peronous brevis, and a portion of the abductor minimi digiti- The distal (phalangeal) extremity is small and much compressed. The tubercle on the external margin, which is readily felt in the living subject, and is an important guide to the surgeon in partial amputations of the foot. will always enable the student easily to distinguish the fifth metatarsal bone from the others, so that upon the whole the second and third are the only two difficult to he recognised, and that owing to their great similarity.

123. The Skeleton of the Toes is composed of fourteen phalanges, each too having three bones, with the exception of the first or great toe, which has only two. The five proximal phalanges partake all of the nature of long bones, they have a body and two extremities, both articular. The proximal (metatareal) extremity in each presents a concave rounded facet, receiving the rounded phalangeal extremity of the corresponding metatarsal Their distal or phalangeal extremity presents two condyloid prominences separated towards the plantar aspect by a distinct groove, in which plays a corresponding ridge seen on the proximal extremity of the middle phalanges, and which eminence or ridge, forms the distinguishing mark of the middle phalanges from the proximal or metatarsal.* The Middle Phalanges are of the nature of long bones, although not exceeding twoeighths of an inch in length, and have a body and two extremities both articular. The proximal extremity prosents a concave surface, divided in the middle with a vertical prominence, corresponding to the groove observed on the phalangeal distal extremity of the proxi-

[.] We somider the middle phalanz u anting in the great for-

mal or metatarsal phalanges; the distal extremity prescuts two condyloid prominences separated by a vertical groove corresponding to an eminence on the proximal extremities of the distal phalanges. The bodies of these phalanges have radges traversing them in their axis to which the sheathes for the tendons of the flexor muscles are attached, and also giving attachment to the interosser muscles. The Distal Phalanger are five in number. Their form is somewhat pyramidal: the proximal extremity is articular, presenting a concave surface divided in the middle by a vertical prominence corresponding to the groove observed on the distal extremity of the middle phalanges. The distal extremity is fungiform compressed vertically, having a rounded rough margin connected with the pulp of the toes. Into the body of these hones, and at the base of this fungiform extremity, are inserted on the dorsal aspect of the foot, the tensions of the extensor of the great toe and the extensor communis digitorum. On the flexor (plantar) aspect, we observe a tubercle into which the tendons of the flexors of the great toe and the flexor communis (perforans) are inserted.

PART II.

DISSECTION OF THE ARTICULATIONS.

124. The anatomy of the joints is examined with most advantage to the student, immediately after the dissection of the muscles and other soft parts. Many of the joints, indeed, such as the knee and shoulders, depend nearly altogether for their strength and security on the muscles and their tendons. Throughout our d scription of the bosses, we have constantly called the student's attention to the articular surfaces, so that although we admit that no part in the anatomy of the body is more important to the practical surgeon than the joints, still, from having made the surfaces of the bones, which are articular in many cases, the principal part of our description, we shall endeavour to repeat as little as possible. During the desection of the ligaments they may be put on the stretch, and very carefully cleaned with a scalpel, whose blade should not exceed an inch in length, so that the fingers of the student may get near the surface he wishes to inspect. Many of the ligaments are delicate and readily divided. Thin and infiltrated subjects are the best not only for dissection, but for making preparations of these parts.

125. The structures entering into the composition of the joints are various. Ist, The ligaments are dense fibrous bundles round or flat, of a glistening white colour, their tissue contains a large proportion of water, becoming hard, transparent, elastic, and brittle when dried. 2d, Cartilages of increatation (covering those surfaces of the hones which we have denominated articular,) are found to be composed of fibres, arranged like the pile of valvet, and attached perpandicularly to the surface of the bone; its fixed surface or connexion with the bone is still but little understood; its free surface is covered by the synovial membrane giving it a smooth homogenous polished appearance 3d, Inter-articular cartilager are fibro-cartilages, in form and properties intermediate to the ligaments and cartilages; they are formed of a bard tenacious, dense, and compact fibrous base, in the meshes of which is deposited a true cartilaginous substance, upon which their remarkable elasticity depends; when dried they become shrunk, hard and brittle. Maceration in water and beiling greatly increases their volume. 4th, Spacetal capsules are transparent and of extreme tenuity, although denser and less pliant than serous membranes. They form bags without apertures, and are applied over all the parts which enter into the composition of a joint without containing my of them. Their internal surface is free, contiguous to itself, smooth, sometimes furnished with fimbriated prolongations, and lubricated by an albuminous fluid named Synoria; their external surface is cellular, attached to all the neighbouring organs as ligaments, fibro-cartilages, capsular ligaments, &c.

126. The articulations are naturally divided into two general classes, the moveable or diarthrosis, and the

immoveable synnethrons,

(1.) Diarthrosis or moveable, presents the following sub-division or species.

Amphiarthrosis Erasple - The junction of the bodies of the vertebra.

Enarthrosis Er .- Hip joint, ball, and socket. with the temporal bone, or

hones of the larsus.

Ginglimus Ex. Ellow-joint hinge.

(2.) Synarthrosis or immoveable, also present the following subdivisions.

Harmonin Ex. Nasal bones with each other.

Suture, Ex. - Parietal homes.

Gousphasis Ex. The touth in the alveoli.

Schindylesis,...... Ex.-Rostrum of the sphenoid bono and vamer.

127. There also exists in various parts of the skeleron a ligamentous connexion, simply without any articular surfaces or synovial membranes, but allowing a certain degree of laxity to the parts than connected. This mode of union has been denominated syndermois.

CRANIAL ARTICULATIONS.

128. The twenty-two bones entering into the composition of the head, are all (with the exception of the lower jaw,) united by sorare. The various sutures seem mostly to proceed from portions of the sphenoid bone.

Sphenoidal suture is very extensive, and connects the sphenoid with the ethmoid, frontal, &c.

Bazilar suture connecting the sphenoid with the occi-

pital hone.

Spheno-temporal suture-Petro-sphenoidal. Spheno-parietal. Coronal suture, or fronto-parietal. Squamons suture, temporo-parietal. Petro-occipital. Mastoid suture, mastoido-occipital.

Occipito-parietal, | Lambdoid suture. Fronto-ethmoidal Ethmoidal soture.

129. The mode of union of the bones of the face with each other, and with the cranium, is very similar to that observed in the cranium itself, and might be named in a similar way; in many instances, however, they present but very indistinct serratures, some of them being nothing more than more juxta-position of surfaces.

and which we have designated harmonia.

130. The Temporo-maxillary articulation, or that conneeting the lower jaw to the head, and which belongs to the order of arthrodia, is double, but it is the same on both sides. It is formed by the fore part of the glanoid cavity of the temporal bone and the tober articulare on the one hand, and the condyle of the inferior maxillary bone on the other. The cartilages of incrustation are thin, and the joint is provided with two synovial captules, an interarticular fibro-cartilage, an external lateral, and on internal lateral ligament.* The dissector soldom sees this articulation is a perfect state, the external part is reached at his commencement of the dissection of the head and neck, and the joint generally opened into. Lastly, if the zygomatic arch is rudely broken for the display of the temporal muscle, few remains of the articulation will be subsequently seen. In point of fact, all this is the result of pure carelessness; with caution, the articulation may be perfectly preserved and dissected, although the internal lateral ligament may not be seen for weeks, after the external aspect has been exposed by the dissection of the parotid gland, &c. The external lateral ligowest is a thin, short, and narrow fasciculus, a little bronder at its upper part than below. It is attached above to the rough surface, which separates the commencement of the roots of the zygomatic process, and descends from thence obliquely backwards, to terminute at the outer side of the neck of the inferior maxillary hone. Its outer surface is covered by the skin and parotid gland; the inner is applied against the synovial capsules and inter-articular fibro-cartilage. The internal lateral ligarorat is thinner and longer than the outer. It arises from the spinous process of the sphenoid bone and the parts in its vicinity, and descends obliquely forwards, becoming broad and membranous as it proceeds, and is attached to the inner and foreside of the orifice of the inferior dentar canal. Its fibres are divergent, especially below. Its outer surface corresponds above to the synovial capsules and external pterygoid muscles; the internal maxillary artery passes between it and the neck of the condyle; and the inferior dentar vessels and nerve have connections with it farther down, and separate it from the ramus of the lower maxillary bone. Its inner surface rests upon the internal pterygoid muscle, so that this ligament separates the two muscles of this name from each other. The synurial capsules are two in number, because this

An appreciate ourd passing from the styloid process of the temporal bear to the angle of the jaw, is named, we think improperly, the algo-variflary figuress, and a broad appreciators passing from the superior to the inferior maxillary bone, external to the molar teeth, has been named the infer-mariflary ligament.

articulation contains in its interior an intermediate fibro-eartilage. The uppur, after being expanded over the cartilage of the glenold cavity, and tober articulare, is continued downwards over the upper surface of the fibro-earthage; while the lower, after investing the inferior surface of the same organ, covers the conclyle of the jaw, being a little more prolonged posteriorly than anteriorly. These two synovial capsules have no communication together, unless the fibro-cartilage is perforated at its centre, which sometimes happens. Externally, they correspond to the external lateral ligament; posteriorly, to the parotid gland; auteriorly, to the external pterygoid muscle; internally, to adipose cellular tissue. Their posterior part is very loose, and strengthened by an irregular fibrous layer, which is perforated by a great number of holes for vascular twigs. The Inter-articular Fibro-cartilage presents the form of a thin lamina, transversely oval, separating from each other the two synovial membranes, to which it adheres strongly by its two surfaces. Its upper surface is coneave from before backwards, a little convex. transversely at its anterior and posterior parts, and is thus accommodated to the disposition of the glenoid eavity. The inferior surface is concave, and covers the condyle. Its circumference lies between the fold of the two synovial membranes; it adheres externally to the external lateral ligament; gives attachment anteriorly to some fibres of the external pterygoid muscle; and, posteriorly, is penetrated by a considerable number of small vessels. It is thicker throughout, and especially behind, than at the middle part, which is often perforated with a hole.

131. The Hyaid Boxe or apparatus is connected with the styloid processes of the temporal by a stender and very clongated fasciculus, broader below than above, formed of parallel, whitish and glistening fibres, which descend obliquely forwards and inwards from the styloid process of the temporal bone to the small horns of the os hyaides, to which it is attached so as to form an extremely acute angle with the great horns. The texture is frequently full of buny granulations, varying in size and number, and sometimes completely ussified; and consequently, in all probability, differing entirely in its nature from the true ligamentous texture, but partoking more of the fibrous expansion, passing from one portion of bone to another.

ABTICULATIONS OF THE HEAD WITH THE VERTEBBAL COLUMN.-OCCIPITO-ATLOID.-BCCIPITO-AXOID.-ATLOIDO-AXOID.

132. Previous to these articulations being reached by the dissector, weeks may have elapsed since his commencement of the dissection of the head and neck; and various sections have been made of the asseous surfaces. To obtain a view of the construction of the pharynx, the soft parts remaining after the dissection of the neck, are out across, and raised from off the surface of the cervical vertebrae. The sculleap having been previously removed, a saw has then to be carried obliquely through the mustoid process of the temporal bone toward a point in the bazilar process of the occipital bone, about a quarter of an inch anterior to the foramen magnum; this section divides the base of the eranium into an anterior and posterior segment. The student has the pharyox, &c. entire for his examination from behind of the constrictor muscles, together with the larvnx, meatures of the nose, &c. on the anterior tegment; and upon the posterior segment he has the longi colli, recti impores, and other muscles, and the ligaments connecting the head to the spine. The dissector will remove with the saw that part of the oncipital bone above the inferior curved line, and any portions of the temporal and parietal bones which may still remain. The ligaments are numerous, and unless studied systematically, will never be clearly understood and remembered. We shall include the first three vertebras in our description of them, and shall describe thom as near as possible in the order in which they will require to be dissected.

183. The Asterior Occipito-Atlaidal Membrane is situated between the anterior arch of the atlas and the corresponding part of the margin of the occipital hole, and is composed of two distinct fasciculi. One of these, which is narrow, round, thick, superficial, and formed of vertical fibres, parallel to each other, has

been named the unterior cervical ligament; it descents from the basilar process to the tubercle of the anterior arch of the atlay. The other portion is much thinner, broad, and membraneous, extends transversely from the outer extremity of one of the occipito-atlantal articulations, to the corresponding point on the opposite side; its tissue is dones and compact, and the fibres of which it is composed are with difficulty distinguished; it gives rise, by its sides, to a fibrous arch, the contavity of which is directed upwards, and which is attached to the fore part of the occipital condyle on the one hand, and on the other to the jugular surface of the same bone; this ligamentous arch is traversed by the pneumo-gastric and spinal accessory nerves, and by the internal jugular vein. The proferior vertuce of this membrane rests upon the odontoid process, its ligaments, and on the synovial capsules of the articulation itself. The Pasterior Occipito-Atlaidal Membrane is broader, and formed of two laminos placed the one before the other, which proceed together from the posterior part of the circumference of the occipital hole. between the condyles, separating as they descend; the anterior, which is thick and presents very distinct vertical fibres, is interlaced with the dura mater of the vertebral canal; while the other, which is of a looser and apparently cellular tissue, is attached to the great arch of the atlas. Between these two laminas there is a slight layer of cellular tissue, traversed by a great number of nervous filaments and vascular twigs, which pass through small holes formed in the midst of the fibres. The nuterior surface of this membrane corresponds to the dura mater. Its extremities form with the upper notches of the vertebra two apertures, through which pass the vertebral arteries and subsoccipital nerves. Precisely the same arrangement will be observed connecting the atlas with the axis. Anteriorly we have the unterior atlanto-azoidal ligament, similar in every respect to the anterior occipito-atlantal; and posteriorly we have the posterior atlanto-around ligament, a repetition of the posterior occipito-atlantal.

134. The dissector will now proceed with a saw to remove cautiously that part of the occipital foramen posterior to the condyles, the portion in fact which corresponds to the lamina and spinous processes of the vertebre; he will remove also the posterior arch of the atlas, and the luming and spinous processes of the second and third vertebre, together with the dara mater, which he will find passing down the canal; the cerebral aspect of the bazilar process, together with the posterior aspect of the first, second, and third vertebree, will be exposed, connected together by the following The asympto-asoidal membrane, arising by a convex margin from the bazilar process, between the internal openings of the anterior condyloid foramino, becoming gradually contracted, is inserted into the budy of the axis, becoming apparently continuous with the great posterior vertebral ligament (a structure of which we shall afterwards speak). The student will next cautiously cut across this occipito-oxoidal membrane near its insertion into the body of the axis, reflect. the upper portion, and he will then expose the following very beautiful system of ligaments and articulations. In reflecting the accipito-exoldal membrane, the dissector will observe that it is attached more or less strongly to the transverse ligament, and some anatomists dissect it in such a manner, as to form what they call the opnoratus ligamentopus.

135. The Transverse or Craciform Ligament of the atlas, is a thick, strong, and firm bundle of fibros, flattened from before backwards, and a little broader in the middle than at its two extremities, extending from the inner part of one of the lateral masses of the atlas, to the corresponding point of the opposite side, passing behind the adontoid process. It describes in its course a fourth of a circle, and completes, with the anterior arch. of the atlas, a ring in which the adoutoid process turns. Its posterior surface is convex; the anterior surface is concave, is contiguous to the edontoid ligaments, to the odontoid process, and is a little covered by the posterior synovial capsule of the same process. This ligament is very strong, dense, and thick, is composed of transverse, parallel, close fibres, commonly separated by narrow intervals, filled with cellular tissue, into two or three distinct bundles, placed above each other.

136. The Occipito-Odontoid Ligaments connect the oc-

tebra (axis), and are two short, thick, round, and very strong fisciculi, with parallel and close fibres, longer below than above, which represent each a sort of cone, whose truncated summits embrace the sides near the apex of the odontoid process, while their bases are inserted in small uneven fissue, formed on the inside of each condyle of the occipital bone; their direction is obliquely outwards and slightly upwards. They touch anteriorly a mass of cellular tissue and the anterior occipito-atlantal lightness, and pasterovly the occipito-axional lightness, which has been removed indeed to expose them. From their functions, they have been called

regulating or check ligaments of the head.

137. The student must now attend to the articulations properly so called, i. r. the osseous surfaces which meet each other, and are covered with cartilage. The combles of the occipital bone are of this nature; they correspond to the superior articular cavities of the atian. An extensive and very loose synovial capsule invests these surfaces; autoriorly, it lines the anterior occipito-atlantal membrane; posteriorly and externally, it is connected with much cellular membrane; internally it covers the extremity of the transverse ligament, a part of the corresponding adontoid ligament, and small masses of adipose cellular tissue, supposed to be synovial glanda. The flexion and extension of the head is performed by means of this articulation. The head, however, has an extensive power of a rotatory kind, and this is effected between the first and second vertebre. The inferior articular processes of the first, or atlas, correspond to the superior articular processes. of the second, or axis; those of the axis are much broader than the curresponding processes of the atlas; they are encrusted with a very thin cartilage, and an extensive synovial capsule invests them. The odontoid process of the second vertebra presents distinctly two articular surfaces-an anterior and a posterior. The unterior plays on the posterior surface of the arch of the atlas; the posterior plays on the anterior part of the transverse ligament: both these articulations are provided with ample synovial capsules.

VERTERRAL ARTICULATIONS OR COMMON ARTICULA-

138. Each vertebra, from the third cervical to the last lumbar inclusive, is placed in contact with that which precedes or follows it, by its budy and articular processes; the lamina and spinous processes of all the vertebrie being moreover connected by ligaments. There results from this, that the common articulations of the vertebrae present themselves under the appearance of an amphiarthrosis for their bodies, and of a plain arthrodia with obscure motions for their articular processes, and that they are further strengthened by accessory ligaments, capable of great resistance. We also observe that such vertebra has, on the one hand, isolated and peculiar means of union, as the ligamenta flava and the fibro-cartilages; and on the other, participates in the use of common organs, which extend at once over the whole vertebral column, or at least the greater part of it, such as the anterior and posterior vertebral ligaments. Any portion of the vertebral column may be selected by the dissector for his examination of these ligaments; but perhaps the four last dorsal and two first lumbar will show him all the ligaments to best advantage. The great unterior vertebralligament, or longitudinal facia occupies the anterior part of the vertebral column, from the axis to the upper part of the sacrum. It is membraniform and of a glistening appearance, and presents very distinct longitudinal strice. which separate so many bundles of fibres, between which there exist small intervals, irregular as to form and position, for the passage of blood-vessels and pellular tissue. This membrane is very narrow in the neck, broader in the back, still broader in the lumbar region, and so disposed as to cover the greater part of the bodies of the vertelstar. The fibres which constioute this membrane do not occupy its whole length; they even have not all the same dimensions. The superficial fibres cover the bodies of four or five vertebrae; those which are intermediate, are lost beyond the third vertebra below that from which they have risen; the deepest are still shorter, and only go from one yertebra to that which is immediately below it. It is also to be observed, that in general these fibres arise in much greater numbers from the fibres-cartilages than

the vertebrae themselves,

139. The student will now, with a small fret saw, or bone nippers, out across all the policles or roots of the processes, and thus remove the posterior part of the spinal canal in a mass. On the posterior aspect of the bodies of the vertebræ thus exposed, he will observe the great posterior vertebral ligament, or longitudinal facia, It extends at the back part of the bodies of the vertelore, from that of the axis to the sacrum. It is broader in the neck and back, than in the lumbar region, where it is so narrow as not to be more than two lines broad in all parts of its course, it is broader opposite each intervertebral substance, than on the bodies of the vertebras themselves, which gives it the form of a long hand contracted at intervals. It is smooth, and of a very shining pearly white. It is in general denser and more compact than the anterior facia, rather thin in the lumhar and cervical regions, and thickest in the back, This membrane, like the anterior, is composed of superficial fibres, occupying the interval of four or five vertebræ or fibro-eartilages, and of deep fibres, extended over two vertebrae only, or even over a single vertebra and its fibro-cartilage,

140. The dissector will next remove entirely these membraniform ligaments, and thus bring into view the Inter-vertebral Fibro-cartilages. These organs resemhle sections of cylinders, of a whitish colour, firm, and possessed of great flexibility. They are situated between the bodies of the vertebra, from the interval which separates the second and third, to that which exists between the last lumbar vertebra and the sacrum. Their form corresponds to that of the bodies of the vertebrawith which they are connected, being oval in the nack and loins, while in the dorsal region they are circular. Those of the neck and upper part of the back, are much thinner than those of the lower part of the back and foins, the latter having a thickness of half an such. But each of them has not an equal thickness in all parts of its extent; in the lains and neck, they are thinner behind than before, and the reverse in the dural region; which constitutes one of the principal causes of the triple curvature of the spine. By their upper and under surfaces, the fibro-cartilages, closely adhere above and below to the corresponding surfaces of the vertebrae; in subjects which have not exceeded twenty years, they are united to the epiphyses of these hones, with which they are easily removed. The intervertebral fibro-cartilages are formed by their circumference by very close fibres, and laminas of the nature of ligaments; the fibres never direct themselves perpendicularly from one vertebra to another; but the outermost ascend from right to left, and cover a layer which has an opposite direction, and which is itself applied against other layers having a different direction. The laming, which are concentric, are numerous anteriorly and laterally, but in less number at the back part; they intersect each other, diminish in thickness, and leave between them wider intervals, in proportion as they approach the centre of each fibro-cartilage. vacuities are filled with a soft, pulpy, homogeneous viscid substance, of a greyish colour; and at the centre itself there is only a very soft, spongy, elastic, arealar tissue, plentifully supplied with the substance in question: this disposition is much more apparent in the lumbar region than in any other part of the vertebral column. In children, this substance is whitish, transparent, and much less abundant than in adults, in whom it has more consistence and is of a yellowish colour-In old people it diminishes still more in quantity, and the fibro-cartilages lose much of their thickness. bodies when soaked in water, swell and increase very much in their vertical extent, frequently acquiring a whole inch of thickness; but it is especially towards the centre that the increase is effected, and if one of them is out horizontally between two vertebras, each portion rises in the form of a cone having its base toward the external laming of the fibro-cartilage, which acquire a red colour on remaining sometime in water. By desiccation, on the contrary, these organs are rendered much thinner, especially in the middle part, which is then reduced to a line of thickness. In the recent state the plasticity of these fibre-cartilages is extremely remarkable, and restores to its direction the vertebral column after it has been variously bent in a dead budy. If a vertical section is made of accordvertebra, the tissue of this budy expands and surpasses the level of the osseous surfaces. Their tenacity or power of columion is also very great, and even exceeds that of the bones with which they are connected.

141. The posterior segment of the spinal canal, which was directed to be removed in order to see the great posterior vertebral ligament, will now be examined by the student. On the internal aspect, most conveniently and almost without dissection, he will observe the Ligamenta subflava. These occupy the interlaminar spaces of the vertebræ, from that which exists between the second and third, to that which separates the last from the sacrum, and complete the vertebral canal behind; they are formed of a strong, firm, and elastic tissue, of a vellowish colour, and composed of vertical fibres. Each of them is divided into two portions, the one right, the other left, angularly united toward the base of the spinous process, but in such a manner as to leave between them a small fissure, which is closed by a cellular tissue. At the upper part of the neck they are thin and narrow; they become thicker and broader in proportion as they descend, and in the loins acquire very considerable dimensions. Their upper edge is attached to the inner surface of the laminae of the vertebra which is situated above; the lower edge is fixed to the very margin of the vertebral lamina beneath. The spinous processes of the dorsal and lumbur vertebrae are connected together by two sets of ligaments, thuse by which the spices of the spinous processes are connected, Supra-spinal and the Interspinal ligaments which occupy the intervals of the spinous processes. The inter-spinal ligaments are lateral, and correspond on either side of the median line, to the erector muscles of the spine. One of their edger is attached above to the lower edge of the upper process, and another below, to the upper edge of that situated beneath. Posteriorly, they are connected with the ligament by which the apiecs of the spinous proocces are connected, and anteriorly with the yellow ligaments. They are composed of irregular bundles of fibres, which follow different directions, but generally proceed obliquely, and in an opposite direction to the

inferior process and the next ligament, so as to cross each other. Each vertebra, the student will recollect, has two superior and two inferior oblique articular processes, the inferior of one vertebra articulating with the superior of the other. These surfaces are incrusted with a very thin layer of cartilage, each being provided with a synovial capsule, and in many instances with strengthening bundles of ligamentous fibres.

STERNAL -- COSTO-STERNAL -- COSTO-VERTEBRAL ARTICULATIONS:

142. The student generally sees the chest or thorax under great disadvantages. The skeleton, when arti-Sciol, is a good preparation certainly, but the chest, in most instances, is very wretchedly imitated. The natural skeleton, when dried, gives perhaps, even a worse idea of the thorax, in consequence of the change produced upon all cartilages and figaments by drying. The dissector should therefore avail himself of every opportunity of examining the chest when recently stripped of soft parts. Large portions of the ribs are always removed in the dissecting room, in order to see the thoracic viscera, and the sternum in every instance is either cut longitudinally for the purpose of injecting the subject, or raised in such a manner as to display the mediastinm, still these sections leave the articulations in a very fit state for examination. The seven superior pairs of ribs are articulated with the spine and sternam, and are hence called the sternal ;the five inferior pairs are also articulated with the aptime. but have only an indirect connection with the sternum, and are called asternal. The student most endeavour to secure the sternum entire with the cartilages of the ribs connected.

143. The Anterior Ligament is broad, thin, membranous, triangular, and copposed of fibres which proceed in a radiating manner from the inner extremity of the cartilage, to be expanded over the anterior surface of the sternum, where they are interlaced with those of the ligaments of the opposite side, and of those situated immediately above and beneath, with the periosteum of the bone, and with aponeurotic fibres of the pectoralis major. The direction of the fibres of this ligament. is such, that the upper fibres pass obliquely upwards, the lower obliquely downwards, and the middle films horizontally , they are not all of the same length, the superficial being longer than the deep-scated, which are shorter the neaver they are to the joint. From the metual interlacing of the fibres of all the anterior ligaments, there results a membrane of considerable thickness (membrani sterni anterne), which entirely mivers the sammu, and which is much more apparent at its lower part than above ; in some subjects, it even forms at the lower port a kind of triangular plane, separate and distinct. The anterior ligament is covered outerootly by the poeteralis major. The parterior ligament is not so thick as the preceding, and its fibous are not so apparent, although their disposition is absolutely the same. By their mutual interlacing, they form unthe mediastinal surface of the sternum, a normbrane (membership merni parterior), as thick as that formed by the anterior ligaments, but smooth, polished, without distinct filtrons fasciouli, unloss it he marely a low which extend over its whole length, which would arom to indicate that it does not outrely originate from the posterior ligaments: It is universed by a considerable number of small blood-vestels. The lignwent of the enoftern cartilage, or custo-alphaid ligament. Besides having the same ligaments as those of the other cartilages of the true ribs, the cartilage of the seventh is connected with the enginera cartilage by a particular ligament, whose dimensions vary much in different subjects. This ligament generally presents itself in the form of a small elongated and very thin fiscicalus, which, arising from the lower edge of the eartitige, descends obliquely inwards, and expands over the anterior surface of the sternal uppendage. uniting with that of the opposite side. It is povered by the rectus abdominis. The exthand seventh cartilages meet each other by their contiguous edges, by means of small oblong surfaces. The cartilage of the eighth rile, and sometimes that of the ninth, presents similar surfaces. Each of these articulations is furnished with a small synorial bursa, much lauser and more apparent than that which exists at the junction of the

preceding cartilages with the sternum; each is also strengthened anteriorly and posteriorly by oblique and irregular fibres, which proceed from one cartilage to the other, much more distinct in the former than in the latter direction. Moreover, the inner extremities of the three or four inferior ribs are connected by a kind of small ligamentous cord, with the lower edge of the next cartilage above. The corresponding extremity of the cartilages of the two last ribs in general, and of the last rib always, are connected salely with the abdominal muscles. The outer extremity of the sterno-costal cartilage is intimately united to that of the ribs; but there is no ligament of any kind to keep these surfaces in connexion, as they do not admit of motion.

144. The student should now remove the ligaments just described, and thus expose the articular surfaces pointed out on the sides of the sternum and extremities of the cartilages,-they are each provided with a very close delicate synovial capsule, with the exception of the first pair of ribs in which there is a perfect contimuity of substance between the costal cartilage and sternom. The careful dissector will also sometimes find in the articulation of the second pair of ribs, a fibrous fasciculus proceeding from the projecting angle of the cartilage to the retiring angle of the sternal cavity, -- an inter-articular ligament in fact. The student will seleet a portion of the spinal column with two or three of the superior rits attached to it; clear away every thing which may be upon the anterior or viscoral aspect of the bodies of the vertebrae, and at the sides he will particularly strip off the plure, and he will thus, with little trouble, display the Radiated Ligament consisting of three flat and thin fibrous fasciculi. which are fixed separately to two vertebrae, and the fibro-cartilage, which concur to form the articular envity, and which, converging, attach themselves all round the anterior part of the head of the rib; they constitute an irregularly quadrilateral fasciculus, with radiating fibres, of which the superficial are langer than the deep-seated. The small middle fasciculus which comes horizontally from the fibro-cartilage is the least distinct. In the first, eleventh, and twelfth ribs, this ligament is not thus divided, presenting only a single order of fibres; part of that of the first rib is attached to the last cervical vertebra, and those of the two others also extend to the neighbouring vertebrus. Reflect this ligament, and remove a very thin portion of the anterior surface of the head and neck of the rib, together with a slice of the inter-vertebral fibro-cartilage, and thus display a very corious mechanism; viz. first, the Synovial capsules, which are two in number, though generally indistinct, and containing but little synovia; secondly, the Inter-articufor ligament, a small fibrous fasciculus of a very close texture, fixed on the one hand to the prominent line separating the articular surfaces of the head of the rib into two portions; and, on the other hand, to the angles of the cavity which receives it, where, in fact, it is continuous with the inter-vertebral fibro-eartilage. Thus, two ligaments connect the head of the rils to the bodies of the vertebra, but the ribs are also connected with the transverse processes, not only by strong ligaments, but also by a proper moveable articulation; first, an Inferior Costo-Transverse Ligament attached to the lower edge of each transverse process descending inwards, is inserted broad into the upper edge of the neck of the rib; beneath, it is very commonly composed of two fasciculi; secondly, a Posterior Corto-Transperse Ligament, of a quadrilateral form and flat, about two lines broad, with close and parallel fileres, which are a little longer below than above; it arises from the summit of each of the transverse processes of the dorsal vertebrae, and proceeds nearly transversely outwards towards the non-articular portion of the tuberosity of the corresponding rib. Its deep-scated fibres are shorter than the others; it is shorter and more oblique in the upper ribs than in the lower; in fact, the last descends a little forwards; that which precedes it is nearly horizontal, and the rest are ascending. Lastly, a Middle Costo-Transverse Ligament only seen when the rib is forcibly separated from the transverse propiss, and its fibres torn amader, or when a horizontal section of these two parts is made, while they are still in their natural place. It seems formed of a cellular substance in which there are perceived some irregular fasciculi of fibres of a reddish colons, which occupy the interval sinusted between the rib and the anterior curface of the corresponding transverse process.

PERVIE ABVIETEATIONS.

145. The left Or Incomposition is commonly, and indeed should always be removed during the dissection of the soft parts, in order to ubtain the lateral view of the pelvic viscera. The joint should not be not into. but the left or pubis should be sawn through vortically. about three-fourths of an inch from the symphysis public. or mid-way between it and the foramen obtaratorium. The articulation of the secreta (which we have shown to be camposed of five vertebra.) with the lifth lumber vertebra, is in general perfectly similar to those of the vertebra, and takes place by three different points; viz. by the oval surface which is at the middle of the base of the sacrum, and which is connected with the inferior purface of the body of the last lumbar vertebra, forming an amphiarthrosis; and by the two articular surfaces, seen behind the entrance of the sacral canal, which constitota a double arthrodia with the inferior articular surfaces of the last lumbar vertebra. The means of union which are met with tere are also the same as in the vertebral column, the mero-vertebral agament being the only ligament not equally observable in the vertebral redume. It is a very short and strong fasciculus of fibres, which arising from the anterior and inferior part of the transvense process of the last vertebra, slescends abliquely outwards towards the base of the sacrom, where it attaches itself, intermixing with irregular fibres placed before the sacro-iliae articulation. Some minute anatomists have shown ligaments existing between the transverse processes of the vertebra, and this sacro-vertebral seems to be one of those on a large seale.

146. The Cocagonal Ferteless are, as we have shown in our description of the bones, four in number, becoming more and more radimentary. We have a continuation of the great anterior and posterior longitudinal facia or common ligaments, and inter-verteleral fibrocartilages: the arches not being developed, the spinal

canal would have been open posteriorly, were it not for the presence of a membrane called the Posterior Sucrococcygeal Egassent, it arises from the margin of the inferior orifice of the sucral canal, and descends over the posterior surface of the coccyx, into which it is inserted. An Auterior Sucro-coccygeal ligament is also desuribed, it is simply a repetition of the great common vertebral ligament, but from the vertex lying upon it, deserves particular attention from the student.

147. The Ossa Innominata are connected with the lumbar, sacral, and coccygeal vertebras in a very powerful manner. Of the three portions which compose each as innomination, two, viz. the iliac and sciatic are directly connected with the spinal column, and the li-

gaments have received names accordingly;

148. The Hio-Lumbar Ligament arises from the summit of the transverse process of the fifth lumbar vertebra, and passing transversely outwards, is inserted into the posterior third of the crest of the illum. few irregular aponeurotic fibres will be observed running from the sides of the sacrum to the ilium anteriorly, or on the visceral aspect of the pelvis, they seem almost continuous with the periosteum, and have received no particular name, so that the dissector should proceed to examine the ligament on the external aspect of this important region. The Lang Posterior Sucra-iliac Ligament (Ligamentativ sacro-spinal ilei) is attached to the posterior and superior spine of the iline and to the lateral, posterior and inferior half of the sacrum-It consists of a very strong, long, flat, nearly vertical fasciculus broader above than below; the superficial fibres, being longer than those placed deeper. The Short Pasterior Sacro-iliac Ligaments is very irregular. very short, and occupies posteriorly the space which the sacrum and ossa innominata leave between them, before the mass of the muscles of the vertebral grooves. The fibres which constitute it are much shorter before, near the articulation, than behind; they cross each other in a number of different directions, and are very close, and pussessor of great firmness; they are attach-

Mr. J. Coquet, in his plates, includes the long and shart sarro-line ligaments urder one name (poeterior secto-iliae).

ed on the one hand to the two first emineness of the posterior aspect of the sacrum, and to the sides of that home at their upper part; and on the other, to the internal surface of the iliac toberosity. Such is their adhesion to these parts, that if the sacrum and as innominatum be forcibly separated, the surface of one or other of these homes is detached along with them, without

their being runtured.

149. The articular and non-articular surfaces which these ligaments bind together, are, first, the semilanar, notched, slightly convex, and uneven surfaces, particularly pointed out in describing the lateral surfaces of the sacrum, and the internal surfaces of the ossa innominata. The true articular surfaces present the appearance of the human ear, and are hence called the faces curiculares; these are each invested by a thin cartilaginous lamina, which however do not come into insmediate contact, there being placed between them a sett yellowish substance, disseminated in insulated flakes, very different from synovia, although performing its function. The dissector will take up his notion of this structure, by examining the left side of the sacrum, from which the left os innominatum would be torn of

in his early dissection of the pelvic viscera.

150. The sacrum is connected with the sciatic portions of the ossa innominata, by two powerful ligaments on each side. These ligaments may be said to complete the inferior aperture of the pelvis; (an aperture of the very last importance to the accoucheur); and include much of the snatomy of this region. We are of opinion, indeed, that it is the want of a clear view of these ligaments (in themselves very simple), which causes this whole region of the body to assume so much complexity to the student. The Great Sacro-Sciatic Ligament is placed at the posterior and inferior part of the pelvis; it is of a triangular form, thin, flat, parrower in the middle than at its extremities. It arises by a broad base from the posterior and inferior iliae spine, the long ancro-iliac ligament, the last posterior tubercles of the sacrum, the lower part of the lateral surface of that bone, and the edge of the coccyx, and directs itself obliquely autwards, downwards, and a little forwards. As it advances, it loses much of its breadth,

but its thickness increases in the same proportion; it is at length attached to the tuberesity of the ischium. lucoming broader a second time, and intermingling with tendingen fibres of the bicops femoris and semitendinosus muscles. Here there is detached a small fibrous prolongation, named by some anatomists the Julyifism ligawant, which winds around the inner part of the inheresity, attaches itself above it by its convex edge, and with its concave edge covers in part the obturative internus muscle, for which it forms a sort of estimat, as it ascends along the ramus of the isolium. The posterior austiner of this ligament gives attachment in its whole extent to fibres of the glutous maximus; the materier is united internally to the small sucrosciatic ligament, and is separated from it externally by a triangular interval, through which the tendon of the obturator internes passes, and pudic vessels and nerve. Its fibres, which converge from the sacrum toward the os innominatum, and are more oblique as they are higher, are so disposed that at the middle of their length the inner cross the outer; they form several planes, separated from each other by cellular tissue, between which pass pretty considerable branches of the sciatic attery. The small sucre-sciatic ligament is smaller than the proceeding, before which it is situated, and therefore must be dissected and examined from the internal aspect of the pelvis; internally it is broad. fixed to the sides of the sterum, and to a small portion of the edge of the coccyx; from this it proceeds outwards and forwards towards the spinons process of the ischium, to which it is attached, contracting and becoming thicker as it approaches its insertion. These ligaments divide the great sciatic notch, as seen in the fully macerated skeleton, into two holes; the upper and larger of which is traversed by the pyriformis muscle, the glutzeal vessels and nerve, and the sciatic vessels and nerves, while the lower and smaller gives passage to the obturator internus, and the pushe vessels and nerve. These two ligaments, while they serve to enument the sacram and or ignominators, also contribute to the formation of the walls of the pelvis; their inner edge nends towards the anns an aponesirotic expansion which supports the levator ani muncle.

The pubic portions of the two assa innominata are articulated with each other mexically; the articular conyex, aval surfaces, particularly alluded to in describing the pubis, under the term symphysis, form this articulation; the term symphysis is more strictly applicable, however, to the articulation; we find the inter-public fibro-cartilage placed between them, precisely analogous to that between the bodies of the vertebra; it is thick anteriorly, and posteriorly forms a prominence, very distinct in the female, and greatly increased in some diseases of the osseous feature. Two ligaments strengthen this articulation; 1% the naterior public ligamost is an irregular fibrous expansion, partly intermingled with the aponeuroses of the abdominal muscles, partly with the periosteum of the bones of the pubis; it appears to be formed of several superimposed layers, which all pass before the articulation; the most superficial of these layers proceeds from the upper part of the symphysis, expanding and separating into fasciculi, to the fore part of the rami of the public arch; the deep fibres are transverse, and unite in their. passage with the lamina of the fibro-cartilage. 21. The sal-public ligament is much stronger than the preceding ; it is a thick and triangular bundle which occupies the upper part of the arch of the pubis, to the upper and inner part of the rami of which it is attached on either side ; its fibres, which are of a yellowish colour, very close, transverse, and a little curved so as to present their concavity below, are very short above, and are continuous with the lamine of the symphysis (inter public fibro-cartilage) : they become longer in proportion as they are lower.*

^{*} Surgical authors speak of a triengules sub-public ligament. Mr. E. Stanley, in a work on the lateral operation of lithocomy, published in Lordon, 1829, gives a view of this structure. We late repeatefly satisfied ornselves of the cornectness of Mr. Stanley's delineation, but we think the term "ligament," ought on no account to be applied to in. The texture has always appeared to us, aparamentic, filling up the sub-public neach or trangle; (not, 116,) strong, immediately under the true sub-public ligament, but gradually degenerating into cellular membrane towards in lase where attentived between the right and left setatic unformers. The unethra, where colled the "membraness portion," passes through it, and the strength of this sub-

The obtarator membrane (mismamed ligament) almost entirely closes the obtarator forement to the circumference of which it is attached, excepting at the upper part, where there is a more or less distinct notch for the passage of the obtarator vessels and nerve; its fibres are interfaced in various directions, and are always more marked toward the notch; its untrine surface corresponds to the obtarator externus muscle, and the posterior to the obtarator internus, both of which are in part attached to it.

ARTICULATIONS OF THE SUPERIOR (PECTORAL)

151. Clasicular Articulations. The clavieles are connected to each other, with the thorax and with the scapulae, in a very secure manner. The interclaviculas ligament, placed transversely above the upper extremity of the stornum, and running however the heads of the two clavieles; this is a very distinet and in some cases a very strong fasciculus, but always in part incorporated with the mighbouring ligaments and tendons. Proceeding from the lower, and rather internal surface of the clavicle, a very strong bundle of ligamentous fibres, having a rhomboidal form, proceeds to be inserted into the upper edge of the first rib, hence named the costs-clasicalar ligament. The nuterior sterno-classicular ligament, broad, and consisting of divergent fibres; it is fixed by its currow extremity to the fore part of the head of the elaviele. whence it proceeds downwards and inwards over the edges of the articular cavity of the sternum, where it is attached by its broadest extremity. A profesior sterno-classicular ligament, narrower and weaker than the preceding; its fibres are also less divergent; it is attached, on the one hand, to the posterior part of the inner extremity of the claviele, and on the other, to the posterior and superior part of the sternum, on the edges of the articular cavity. The student most divide the anterior sterno-clavicular ligament mesially, and reflect it carefully to the right and left,

public openeurosis is so great, as to offer an almost insuperable obstacle in the passage of a eatherer into the bladder, unless the operator is aware of its existence and true nature.

and thus expose the inter-articular fibra-cartilage; this is a nearly circular place, fitted to the articular surfaces of the sternum and clavicle, between which it lies; it is thicker at its circumference than in the centre, which is sometimes perforated; the circumference is united to the ligaments described above, especially the anterior and posterior; above and behind, where it is very much thicker, it is fixed to the head of the elavicle; inferiorly and internally where it is very thin, it is attached to the union of the sternum with the cartilage of the first rib, partly confounding itself with the perichondrium of the latter. The structure of this organ is perfectly similar to that which we observed in the filiro-cartilage of the temporo-maxillary articulation; its fibres are also much more apparent at the circumference than at the middle part, where they cannot be distinguished. The Sumsial Membranes are two in number, on account of the disposition of the inter-articular fibro-cartilage. The scapular extremity of the clavicle is connected to the acromiun process of the scapula by means of five ligaments. The Superior acromio-clavicular Ligaracut forms a broad and thick fasciculus, of a quadrilateral form, flat, shorter before than behind, which covers the whole upper part of the articulation, and which is itself covered by the interlaced aponeurosis of the deltoid muscle and trapezins; it is composed of parallel fibres, directed obliquely from within outwards, and from behind forwards, which are attached, on the one hand, to the upper part of the outer extremity of the clavicle, and on the other to the upper part of the acromion. The inferior acromin-classicalar ligament resembles the superior in form, and is nearly as distinct; its fibres, which are laxer and less numerous, frequently leave intervals between them, and are attached to the lower edges of the two surfaces; anteriorly, it is continuous with the preceding ligament, but is suparated posteriorly from it by a space which is filled with cellular tissue. The synomal capsule contains very little synovia, and is sometimes double, on account of the presence of an inter-articular fibro-cartilage; its disposition is very easily conceived in the two cases, and its outer surface is only in contain. with the two ligaments of the articulation, and with enidular tissue. The elavide is connected to the coracoid process of the scapula by two ligaments. The cornerclavicular ligament, composed of two strong bumiles of ligamentous fibres, whose direction is different and separated from each other anteriorly, in a distinct manner, by an angular space filled with cellular tissue; they are seen when the clavicle has been cut neross, and the extremity entirely removed from the trunk; the clavicle then raised and twisted backwards, will bring into view, first, the posterior and inner fasciculus, sometimes named especial, has the form of a reversed cone : it is shorter than the other, with close and divergent fibres, and is attached by its base to a tuberosity which the lower surface of the clavicle presents externally, and by its summit to the broadest part of the corneoid process. The anterior and external fasciculus, named trapezoid, is placed at the distance of an inch from the scapplo-clavicular artigulation, is longer and broader than the posterior; it is also thinner, and has a quadrilateral form; its fibres, which are shorter behind than before, are separated by small cellular spaces; it is attached superiorly to an oblique line, which proceeds from the above takerosity to the extremity of the playiele, and inferiorly to the inner and posterior part of the upper surface of the cosrappid process; it unites posteriorly with the preceding ligament, forming a very distinct projecting angle, but anteriorly they are more apart, owing to the presence of the subclavius muscle whose costal attachment intervenes between them. Each scapula has strong aponeurotic flattened fasciculi, running from one point of the bone to another, in other words, proper or belonging to the scapula; they are three in number, The Aeromio-coracoid Ligament or Membrane, triningular, broad, thin, and flat, and stretched transversely between the corneoid process and the acromion, broader at the end next the coracoid attachment than at the other; it is indeed attached to the whole extent of the outer edge of the corneoid process by two fasciculi, at first suparated by cellular tissue, and afterwards united into a common bandle, which becomes narrower and thicker as it approaches the summit of the aeromion into which it is inserted; one of the two routs of this handle is unterior, shorter, brouder and thinner, and

threeted transversely outwards; the other, which is posterior, longer, narrower and thicker, is directed obliquely backwards and outwards; both are, however, connected by a slight fibrous membrane, and completes the vault formed by the aeromiou and coracold process above the head of the humerus. 2d, The Caracoid Ligawent or Mewbrane is a thin and flat fisciculus attached to the base of the coracoid process, stretched across the notch in the cervical margin of the scapula, and attached to the posterior part of that notels. The supra-scapuhar nerve very generally passes under this membrane. 3d, The Membrong cervicus respelor is attached to the upper part of the neek of the scapula, and lays hold of the concave margin of the spine of the scapula, where it is surmounted by the acromion process, under this membrane creeps a large branch of the supra-scapular artery to anastomose in the fossa infra-spinata with the subscapular artery; it also separates the supra-spinatus from the infra-spiratus muscle; this ligament was well

represented in the plates of the Caldanis.

152. Shoulder Joint (Scapelo-Humeral). The assessus articular surfaces are the head of the humerus and the glenoid cavity of the scapula. The aeromio-coracoid membrane, however, must be taken into view in studying the joint. The whole of the surfaces entering into its composition, are in a great measure covered by the deltoid muscle; immediately under this muscle, a large and extensive bursa muccesa is always found, and often leads the student into the mistake that the cavity into which he has opened in his section of the deltoid is really the joint, or if left in shreds, obscures the true enpsular ligament. The point will be best seen if the acromion process has been divided from the spine of the scapula, leaving it still attached to the coracoid process; this section is necessary in order to see the supra-spinatus muscle. The capsular muscles, viz. the supra-spinatus, infra-spinatus, and sub-scapularis must be dissocial with the greatest enre, for their tendons become intimately incorporated with the capsular ligament of the joint. The Copsular or Orbicalor Ligareent has the form of a hollow consid, truncated, the summit of which embraces the contour of the glenoid cavity of the scapula, while its base is fixed around the neck of the humerus, the

circumference of which has more extent than that of the glenoid envity; its looseness, when the surrounding rapsular muscles have been reflected, is very remarkable, permitting the esseous surfaces to separate from each other more than an inch. Its upper edge is attached around the glenoid cavity, beyond the glenoid ligament; its inferior edge is fastened to the base of the neck of the humerus, expanding and prolonging itself considerably beneath this portion of the hone at its lower part ; between the two tuberosities of the humerus, this edge is interrupted by the passage of the tendon of the biceps flexor muscle, which traverses this, the capsular ligament, in order to reach the superior part of the glenoid envity into which it is inserted. The Caraco-humeral or Accessory Ligament: it is situated at the upper and inner part of the articulation, and is formed by a very dense fasciculus, which arises from the outer edge of the coracoid process, and proecciling forwards and outwards, is attached to the interior part of the great tuberolity of the humerus, mixing its fibres with those of the tendon of the infra-spinatus muscle; its inner surface is intimately united to the capsule in the greater part of its extent. The student will divide the espendar ligament on its internal aspect by two incisions crossing each other, and he will thus be enabled to look into the joint, and see the Glenoid Ligament. This is a fibro-cartilaginous rim, increasing the depth of the glenoid eavity; it is especially formed by the fibres of the tendon of the long portion of the biceps muscle, which bifurcates at the upper part of this cavity, embracing it, in the interval between its two branches; there are also distinguished in it, proper fibres; it has a somewhat prismatic and triangular form; its thickest portion is fixed upon the circumference of the cavity; its free edge, thin and sharp: the synovial membrane covers this ligament-The Synoxial Capsule, after lining the glenoid cavity and the ligamentous rim which surrounds it, is reflected backwards over the neck of the scapula to reach the inner surface of the capsular ligament, which is entirely covered by it; and where the fibres of this ligament separate, it is applied immediately upon the side of the tendon of the subscapularis muscle, render-

ing it almost impossible entirely to dissret off this musele and tenden without opening the joint; after arriving at the neck of the humeros, it is reflected to proused over the eartilage of its head; where this reflection takes place, it furnishes a prolongation which deseends for about an inch along the bicipital groove, ascending again upon the tendon of the biceps muscle, enveloping it on all sides, to the glenoid cavity, and forming inferiorly a col-de-sac, which prevents the syanvia from flowing out. By this arrangement, the tendon of the biceps traverses the articulation freely, but is not contained in the interior of the synovial membrane. The dissector finds at first great difficulty in understanding how the tendon of the biceps muscle, whilst in the joint comes to be surrounded on all sides by the synovial capsule, and yet not actually enclosed within the sac. The German anatomists think it easily explicable by changes which take place in the growth of the fortus-the tendon being in the very early fortus connected to the wall of the joint by a process like a mesentery, which process becoming ruptured and obliterated, leaves the tendon quite free within the joint, and surrounded as it would seem on all sides as in a sheath, by the synovial capsule.

153. Elbow-joint, (Humero-cubitat). This articulation constitutes a perfect angular ginglymus, formed by the meeting of the superior extremities of the ulna and radius with the inferior extremity of the humerus, These different parts present in their aggregate two transverse rows of eminences and exvities, which fit into each other in a very close manner, and all whose surfaces are invested with cartilages that of the cavity of the radius is continued thinner over the cylindrical circumference of its extremity. The cartilage of the great sigmoid eavity of the ulna is prolonged over the small cavity of the same name; it is interrupted at its middle part by a transverse depression, widened at its extremities, where it is converted into notches. Four ligaments serve to keep together the surfaces of this articulation, which are lined in their whole extent by a symmial membrane. The materiar ligament, thin, composed of oblique films, separated from each other by intervals tilled with cellular tissue; it covers

nearly the whole of the articulation anteriorly; its superficial fibres, which are very numerous, pass from the internal tuberosity of the humerus to the annular ligament of the radius, with which they are incorporated; the middle fibres, which are vertical, arise from the humerus between its two condyles, and are lost among the proceeding; the deep fibres which are also vertical, are collected into isolated fasciculi; they proceed from the coronoid eavity of the humerus, and gradually disappear upon the synovial membrane. The posterior ligameet can only be well seen when the fore arm is bent upon the arm, and is much weaker than the anterior; it is formed of two separate fasciculi. One of these, which is internal, is nearly parallel to the posterior fisciculus of the internal lateral ligament, and ascending from the summit of the olecranon, is inserted into the inside of the pully or trochles of the humers, and the edge of its olecranal cavity: the other fasciculus, which is external, is a sort of fibrous band, extended between the two tuberosities of this bone, immediately behind the olegranal cavity. The external lateral ligamost consists of a short flat triangular fasciculus, arising from the most prominent point of the external condyle of the humerus, and inserted into the annular ligament of the radius, a strong portion of its fibres passing over this ligament to be inserted into the outer edge of the ulna. The internal lateral ligament is triangular in form, and composed of two distinct bundles, one running from the internal condyle of the humerus, to the inside of the coronoid process of the ulma, the other also proceeds from the internal tuberesity of the humerus, but is inserted into the inner part of the olecranon. The synceial membrane, is common to the humero-cubital articulation, and that of the two bones of the fore-arm at their upper part; applied behind the anterior ligament of the articulation, from which it is separated by a great quantity of cellular tissue, this membrane descends towards the neck of the radius, around which it forms a sort of cul-de-sac, directing itself from the inner surface of its annular ligament; it then ascends into the envity of the head of the radius, massing between the inner side of its circumference and the smaller sigmoid cavity of the plant it is then continued into the larger sigmoid cavity, and from thence proceeds to the internal surface of the tendon of the triceps extensor, of the lateral ligaments, and of the posterior ligament, to arrive at the electronal cavity whence it proceeds to the different articular surfaces of the inferior extremity of the humerus, which it covers, and then arrives at the coronoid ravity, whence it finally proceeds to the point from which we have imagined it to

set out.

154. Cubito-Radial Articulation. The anterior ligament of the elhow joint must be out transversely and reflected, this will exhibit the course of the zynovial capsule, together with the following ligaments:-The annular or orbicular ligament, a very strong, flat, fibrous band, about two lines broad, very dense and sometimes cartiloginous, with circular fibres more apparent at the extremities than in the middle part; it surrounds the neck of the radius, and with the small sigmoid cavity forms a sort of ring in which the radius turns; the ligament forms about three-fourths of this ring, and is attached, on the one hand, to the unterior edge of the small sigmoid eavity, and on the other, to its posterior edge. The Lower Radio-cubital Articulation is formed by the reception of the head of the ulna into a concave articular surface which the radius presents at its lower and inner part. The principal means of union observed here is the Triangular Fibra-Cartilage, placed transversely between the lower extremity of the radius and ulua; denser and more cartilaginous at its circumference than at the centre, thinner and breader externally than internally, and formed of filtres more apparent below than above; its upper surface, which is concave and smooth, is contiguous to the lower part of the head of the ulna ; the lower, which is also concave and smooth, is in connexion with the cuneiform bone; its unterior and posterior edges are connected with the ligaments of the wrist-joint; its have is inverted into the prominent edge, which separates the carpal cavity of the lower extremity of the radius, from that which recoives the nina; sumetimes it is only connected with it by means of the synovial membranes; lastly, its summit is attached to the depression, which separates

the styloid process of the ulna from the articular surface of that bone; this structure will be properly seen and best understood when the carpus has been removed, and the student looks on the distal extremity of the radius and what. The synorial weisbrane is remarkably loose anteriorly and posteriorly, where it is covered by some oblique and irregular fibres; it passes from the ulna to the radius, forming between them a very loose cal-de-sac, and from the latter bone is reflected over the upper surface of the triangular fibro-cartilage; the quantity of synovia which it contains is always very great. The radius and alna, in addition to these distinct articulations, are connected to each other by a thin aponeurotic membrane, the Membrana Interessen Anti-Brockii: this membrane is intimately incorporated with the periosteum covering these two bones, and by its means to two ridges particularly dwelt upon in their description, it very nearly fills upthe interspace between the radius and ulna, leaving a deficiency, superiorly, however, through which pass the posterior interesseous vessels, whilst the anterior interosseons vessels and nerves pass through an oval aperture in it inferiorly. On a plain, anterior to the interosseous membrane, we find a bundle of aponeurotic fibres attached to the root of the coronaid process of the ulna, descending parallel to the inner edge of the tendon of the biceps, and inserted immediately beneath the bicipital tuberosity of the radius; this aponeurotic bundle has received from some anatomists the name of the round ligament, membrana transversalis cubiti, chlique ligament, &c., it is rendered tense when the hand is supined, and thus seems to limit that action.

155. Wrist-joint, (Radio-Carpal Articulation-) The ossess articular surfaces entering into the composition of this joint, are the distal extremity of the radius on the one hand, the scaphoid and semilunar bones on the other. The triangular fibro-cartilage we have mentioned as connecting the radius and aina together inferiorly, is so placed as to lie between the lower end of the aina and consiform bone. The student should divide the bones of the fore-arm about an inch above the wrist-joint, clearing away entirely the interessions membrane. The anterior figuracut of the wrist-

joint is delicate, reticular, and membraniform, arises from the fore part of the lower extremity of the radius, and is attached to the palmar aspect of the scaphood, sensilunar, and conciform hones. The poterior liganomi is exceedingly delicate, arises from the posterior part of the lower extremity of the radius, and descending obliquely, is attached to the posterior non-articular ourface of the semilunar and conciform bones. The enteruni lateral ligament has a triangular form and is very strong, readily felt in the living body; it descends from the summit of the styloid process of the radius to the outer non-articular part of the scaphoid, its fibres diverge-the anterior are long, and are continuous with the retinaculum of the carpus, extending as far as the trapezium. 'The internal lateral ligament passes from the summit of the styloid process of the ulna, to the inner side of the cuneiform hone; it is also slightly conneeted with the retinaculum and pisiform bone. The aquorial capsule is ample and always contains a considerable quantity of synovia; it is reflected over all the articular surfaces and ligaments forming this joint, and covers the inferior surface of the triangular fibro-cartilage.

156. Carpal Articulations. Our description of the carpal bones will be found confined very nearly to that of the articular surfaces; the joints it might he concluded will be very numerous, and so in truth they are, but it is a fact, that one synovial capsule nearly covers the whole. The head of the os magnum forms, as it were, the centre of the movements performed by the carpus. The synovial consule lines this rounded head extensively, sending processes right and left, and particularly two upwards on each nide of the semilurar bone,-it sends three prolongations dawnwards, thus reaching and investing the articular surfaces between the carpus and metacarpus, and of the superior metacarpal articulations, between the latter in various enla-de-sac. These carpal bones are hound together in a very powerful manner by short ligamentons fibres laying hold of and covering all the non-articular surfaces both of the unterior and posterior aspects, and hance named dorsal and palmer Leaments. When the bones of the carpus are articulated, the

student will also observe, that a variety of surfaces, although non-articular are yet opposed to each other, but do not come into close contact; we find here a system of short but very strong ligamentous fibres approaching almost a fibro-cartilage, called interesseous ligaments, running from one bone to another. The Pisificial Bone is connected to the other carpal bones by two very strong distinct ligaments, one is external and goes to the hook-like process of the uncaform bone, the other is internal and terminates at the upper

part of the fifth metacarpal tome.

157. Curps-Metacurpal and Metacurpal Articulations. The metacarpal bones are not only articulated with the carpal, but with each other; prolongations of the same synovial capsule which invested the carpal hones cover also their proximal extremities, with the exception of the thumb, and third and fourth, where small separate synovial bags exist; they are secured by short but strong ligamentous fibres running in a variety of directions, and receiving the names of transverse, oblique, unterior, posterior, &c., according to their course and position. The articulation of the first metacarpal bone, or that of the thumb with the trapezium, is very peculiar; the joint is a good specimen of an arthrodia; the thumb possesses an almost universal motion, it has not only a distinct system! measbruse, but even a capsular ligareest a this ligament is formed of longitudinal fibres, more distinct externally and behind than in other directions, and passes from the unper extremity of the metacaspal bone, to that of the articular surface of the trapezium. The distal extremities of the second, third, fourth, and fifth metacarpal bones are not in direct contact with each other, but are connected together on the palmar aspect by a very peculiar and powerful fibrous band about two lines broad: the superficial fibres are long and embrace the heads of these four metacarpal hones, whilst the deeper are short, going only from one bane to another; this structure has received the name of the transverse metacurpal ligarorut.

158. Metacorpo-Photongral Asticulations. These articulations are formed by the reception of the heads of the metacorpol hones into a concave and superfi-

cial surface, presented by the proximal extremities of the five proximal phalanges. The surfaces are all covered with cartilage, but those of the phalanges are much less extensive than those of the metacarpal bones. When the hand is closed, the rounded heads of the metacarpal bones project and form what are vulgarly called the knuckles; from want of attention to this, few students, even of some standing, can point out the precise position of these joints. An ample synorial capsule invests the surfaces entering into the composition of these joints. The anterior hyament is a fibrous half-ring, embracing the anterior part of each articulation: the transverse metacarpal ligament is intimately connected with this structure; it is in this anterior ligament that we find osteides developed, in the thumb always, and often in the other fingers, particularly in the hands of stout men accustomed to hard work, as the blacksmith, &c.; we see this structure in its highest state of development in the elephant, where every finger and toe has its pair of esteides connected with this joint. The lateral ligaweeds arise from the lateral parts of the head of each metacarpal bone, in a small depression, and descend obliquely forward, to be attached to the two sides of the upper extremity of the phalanx; they are thick, broader above than below, rounded, and composed of longitudinal, parallel and very numerous fibres.

159. The Phalangeal articulations are perfect angular ginglymi, and are all very much alike in respect to their articular surfaces and ligaments. The thumb has only one, while each of the other fingers has two. The condyles of the distal extremity of the proximal and middle phalanges are incrusted with cartilage, as well as the corresponding exvities of the middle and distal phalanges. Each of these articulations has an anterior ligament, two lateral ligaments, and a synovial capsule. The enterior ligament, which is of the same form as that of the preceding articulation, is attached to the two sides of the extremity of the phalanx above, and receives autoriorly a great number of dense and glistening fibres, which proceed from the sheath of the flexor tendons; it is less marked in the proximal, than in the distal phalangeal articulations. The lateral ligaments are precisely similar to those of the articulations of the metacarpal and proximal phalanges. Lastly, the symmial membrane also resembles that of the above mentioned articulation; it is intimately connected posteriorly with the tendons of the extensor digitorum as in the last articulation.

ARTICULATION OF THE INTERIOR (PELVIC)

160. Hip-joint, (Coxo-Feworal). This articulation is an enarthrosis, resulting from the reception of the head of the femur, into the cotyloid cavity of the os innominatum; these two surfaces are covered by a very distinct diarthrodial cartilege; that of the head of the femur is much thinner at its circumference than in the middle, where it is interrupted by a depression which gives attachment to the round ligament; the cartilage of the entyloid envity which presents the reverse arrangement as to thickness, is deficient at its bottom, where a body supposed glandular is situated. This articulation is furnished with a synovial membrane, a capsular ligament, an inter-articular ligament, and a cotyloid ligament. The capsular ligament embraces the whole articulation, and extends downwards and outwards, from around the margin of the cotyloid cavity to the base of the neck of the femur; its thickness is very considerable, especially at the fore and upper part, where it is strengthened by a fibrous band which descends from the anterior and inferior spine of the os innominatum, incorporates with the capsule, and terminates at the anterior line of the base of the neck of the femur, becoming much broadened; the student will observe that this ligament is attached to the os innominatum in such a way as completely to conceal the cotyloid cavity, and cotyloid ligament; it takes strengthening bands from both the anterior spinous processes of the ilium, and thus approaches close to the brim of the pelvis; it ascends higher externally than internally, and is strengthened considerably by the curved tendon of the rectus femoria muscle : its femoral attachment merits most particular attention, and ought to be made out by the dissector in the clearest manner; its limits are, an-

teriorly and posteriorly, the two inter-trochanteric lines, and the trochanters themselves above and below, and thus the student will remark, by a reference to the hones, sucludes not only the head, but also the neck of the femur. The student will now pince up a small fold of the outer and upper part of the capsular ligament, make a small opening into the joint, and introducing the blade of a pair of seissors, divide the outer capsule by a circular incision, reflect the cut portions right and left, and he will then see the following structures. The inter-articular (round) ligassent extending from the extremittee of the inferior notch of the cotyleid cavity to the rough depression on the head of the femur; it is onveloped by a very loose sheath of the synovial membrane; its base is formed of two flattened bands, of which the upper and smaller comes from the corresponding extremity of the cotyloid notch, internally of the ligament of the same name, while the inferior, which is larger, comes from that of the opposite side! These two bands are united by a fibrous membrane, and are blended together towards the head of the femur. The corpleid ligament is applied upon the bone by a base about three lines broad, and presents a free and sharp edge, inclined a little inwards, which embraces the circumference of the head of the femur when in vita; this structure is breader opposite the notches of the cavity than in their intervals, and is not continuous with the diarthrodial cartilage, there existing a very distinct circular groove between them; at the notch of the cotyloid eavity it passes from one of its extremities to the other. and thus transforms it into a true hole. Two bundles of ligamentous fibres are attached in addition beneath the filtro-cartilage to the two sides of the catyloid noteh, forming two planes which cross each other; the desper (internal) of these planes comes from the upper side, and is partly attached to the lower, where it is blended with the cetyloid ligament; the other (external) is superficial, ascends towards the upper part of the noteh. is incorporated with the same ligament, and also with the obtaining membrane. The appendix required in expanded over the cartilage of the head of the famor, and neck of that home, investing a dense, thick membrane,

with longitudinal and separated fibres, called by some the retingentum of the copreder ligarient, and which is a most important structure in the pathology of this articulation; it has been also termed the reflected ligament of the nock of the femur; but after all may be merely perinsteam greatly strengthened; at the base of the vervix femoris the synovial capsule is reflected over the capsular ligament, which it lines in its whole extent; from the circumference of the cotyloid cavity, it may be traced over the two surfaces of its fibro-cartilaginous rim, entering into its interior, covering a redslish cellular tissue which occupies the foven, adhering strongly to it, and lastly, reflected along the round ligament to the cartilage of the head of the femur. Beneath this synovial membrane, in the back part of the bottom of the cotyloid cavity, is a flattened mass of reddish cellular tissue, mingled with a soft and unctuous substance, forming the largest of the organs that have been described under the name of symmial glands; it receives a great number of arterial ramifications, which arise from a small branch of the obturator artery which enters the cavity by its inferior noteh; some of these ramifications lose themselves on the membranous shouth of the inter-articular ligament; these ressels are accompanied by a nervous filament of the same name, and are surrounded by a layer of more or less dense adipose tissue, disappearing on the edge of the mass itself, which is surmounted by very large fringes. The whole circumference of the head of the femur, is moreover surrounded with numerous small grains, of the same nature as those which we have already pointed out in several of the articulations; there is one very large grain of this kind, which raises the synuvial membrane close to the insertion of the interarticular ligament, at the centre of the head of the femur.

161. The Knee-Joint (Finance-Tibial) is an ungular ginglymus; the condyles of the femur, the upper extremity of the tibin, and the posterior surface of the patella are the articular oscons surfaces entering into its composition. The dissector will observe in dissecting the muscles, that the expanded tendons of many of these contribute greatly to strengthen this joint, and must recollect that many of them are lined

by the delicate synovial capsule, and cannot be dissected off, without opening into that capsule. He will particularly attend to the tendon of the semi-membranous muscle, which he will find intimately connected with, if not forming the posterior ligament. The muscles or tendons being cut short, and the whole trimmed, the following structures should be viewed in succession. The Ligament of the Patella. This ligament seems the continuation of the tendon of the extensor muscles of the log, having in its substance an osteid (the putella.) Careful dissections have satisfied us that the patella is developed in a cartilage, and is connected to the tibia by a distinct ligament, which, however, is most intimately blended with the tendons of the extensor muscles; the whole forming a flat bundle, narrower at the middle than at its extremities, extending from the inferior angle of the patella, and the depression at the lower part of its posterior surface, to the tuberele of the tibin; its anterior surface is covered by the akin, and a prolongation of the fascia lata; the posterior mefore rests at its upper part, on an adipose mass of considerable size, and at its lower part is separated from the tibia by a small bursa mucosa, which is extremely luose, and rather plentifully supplied with synovia. The Long External Lateral Ligamens is a strong, rounded, fibrons cord, which descends vertically from the tuberosity of the external condyle of the femur, to the outer part of the head of the fibula; another ligamentous bundle appearing accessory to this, passes, behind, and parallel to it, from the lower part of the external condyle of the femur to the summit of the upper extremity of the fibu-In. The Internal Lateral Ligarrant descends from the tuberosity of the internal condyle of the femur to the upper part of the inner edge and surface of the tibia; it is flat and membranous, thicker anteriorly than posteriorly, much broader below than above. The Postsrior Ligament (Ligamentum posticum Winstoli.) Some anatomists consider this ligament as a division of the appnearosis of the semimembranosus musele. It appears, however, rather to form a distinct ligament, which is deeply seated at the back part of the articulation, and directed obliquely from the internal tuberosity of the tibia to the outer condyle of the femur. Its fibres are irregular, and present frequent separations for the pussage of vessels. It is covered by an apuneurotic plane, which really comes from the seminembranesus, and is upplied upon the crucial ligaments, from which it is separated by a great quantity of fat, and by the middle artigular yessels. The dissector will now proceed to open the joint, so as to see the remaining structures, and trace the rendered capsule. We prefer carrying a saw vertieally through the patella, completing (with a knife) the division of the ligamestate pateller and tendon of the extensor muscles. This section will enable the student to trace all the intricate reflections of this very complex synovial capsule. The sysocial caprule will then be observed forming a very loose and distinct cal-de-sac, behind the tendon of the extensor muscles, it then passes over the posterior surface of the patella, but leaving the bigament of the patella, rests on a quantity of fat, and forms a prolongation which traverses the articulation, and passes to the space between the condyles of the femure returning to the point of reflection from the ligamentum patella, it may be traced over both surfaces of the semilunar eartilages, over the articular surface of the tibia, and forming two folds, which have received the name of aler, it invests the crucial ligaments on threesides, reaches the condyles of the femur, covers them, and thus the student returns to the point from whence he started. Having carefully viewed this very complex but most important structure, the dissector should cut it away freely, and also cut across, and reflect the ligament of the patella, the internal and external lateral, the posterior ligaments, and thus see in a clear and precise manner, not only the structures which he has thus divided, but those which still remain to be seen. The Auterior Crucial Ligament is attached to the inner and back part of the external condyle of the femur, whence it proceeds obliquely towards the uneven depression, which is situated on the fore part of the spine of the tibin, where it is continued into the anterior extremity of the internal semilunar fibro-cartilage. The Posterior Crucial Ligament arises from the outer and fore part of the inner

condyle of the femur, crosses the direction of the anterior cracial ligament, proceeding obliquely outwards and backwards, to the posterior part of the spine of the tibin; its inferior extremity seems divided into two fasciculi, of which one is attached to the tibia, while the other is continued into the posterior extremity of the external semilunar fibro-cartilage. The Semilunar or Inter-articular Filoro-cartilages are two crescent-shaped fibro-cartilaginous lamina, thick at their convex margin, and thin at their internal concave margin; situated between the condules of the femur, and the articular cavities of the upper extremity of the tibia, of which they only occupy about the two external thirds, so that the middle of each articular cavity is free; the internal semihonor cartilage is nearly semicircular, a little clongated from behind forwards, and bronder posteriorly than anteriorly; its concer margin, which is directed inwards, is partly united to the internal lateral ligament; the asterno catremity is attached to the fore part of the spine of the tibia, and is continuous with the anterior eracial figament; the posterior extremity is attached behind the same eminence. The other fibro-cartilage is externel; it forms nearly an entire circle; it is broader before than behind; its conver margin, which is directed outwards, is contiguous posteriorly to the tendon of the puplitous muscle, and more anteriorly, affords points of attachment to the posterior fasciculus of the external lateral ligament; its autorior entremity is attached to the rough depression, which exists at the force part of the spine of the tibis, but this insertion takes place much farther back than in the preceding eartilage; its posterior extremity is attached behind the spine of the tibis, before the insertion of the other cartilage, posteriorly to that of the posterior crucial ligament, with one of the two fiscicali of which it is continuous. These fibro-cartilages are composed of concentric fibres, longer externally than in the interior, less compact towards the extremities than at the middle; they are connected anteriorly to each other by means of a small ligamentous fisciculus (ligamentou transcerson), sometimes wanting, about a line broad, and surrounded by soft and yellowish adipose substance ; their upper surfore is concave, the forer nearly plain; their renease edge is thin, sharp, and free, and their middle part is hollowed.

162. Tibio-Permeul Articulations. The Anterior Ligament of the superior tibio-peroueal articulation descends obliquely outwards, from the fore part of the external tuberesity of the tibia, to the forepart of the head of the fibula and is strengthened and covered in a great part by the tendon of the biceps flexor cruris. The posterior ligument is less marked, and much weaker than the auterior, and is composed of closer fibres; it presents the same arrangement behind the articulation, as the other ligament does at its fore part; it is covered by the popliteus, and sometimes the synovial membrane of the knee joint extends to it. The synorial capsule is always contiguous with that of the knee joint. The tibio-peroneal interpretous membrane occupies the interval between the tibin and fibula; at the upper and outer part, this membrane presents a pretty large aperture for the pasange of the anterior tibial vessels, and inferiorly presents a hole, which gives passage to a branch of the peroneal artery. The convex articular surface of the inferior extremity of the fibula is fitted to a concave. surface of the tibis, forming the inferior tibio-personal articulation. An anterior ligament is attached to the fore part of the lower extremity of the filiula, and is inserted into the fore part of the neighbouring portion of the tibia. A porterior figurest is attached on the one hand, behind the tarsal extremity of the fibula, and on the other, to the neighbouring part of the tibis. A penterior and inferior beament, continuons with the preceding, is inserted behind the mallenlus externus, and directs itself transversely to that of the tibia, passing to the posterior part of its articular surface, and forming a very distinct fibrous fasciculus; it forms part of the cavity, which receives the articular pulley of the astragalus in the ankle joint. The wiferear inferestions ligament fills up the interval left by the psseous surfaces of the articulation above their cartilages; it is a dense tissue, intermingled with some adipuse flakes; its fibres are very short, and adhere strongly to the bones; it seems to be continuous alone with the superior interesseous ligament, and can only be well seen on reparating the two bones by force.

163. The Ankle Joint (Tibio-Turval) is a perfect angular ginglymus; the fibula and tibia form together a cavity which receives the astragales, and whose depth is increased by the two malleoli. The tibin and fibula have each their articular cartilage, which is prolonged over their malleoli, and the surface by which they touch each other. The articular pulley of the upper surface of the astragalus, and its lateral articular surfaces, are also invested by cartilage. A synovial membrane is extended over all the parts of this articulation; to which belong two lateral ligaments, two anterior, and a posterior. The internal lateral ligament is a broad quadrilateral band, descending obliquely backwards from the summit of the malleolus internus and its dopression, to the inner part of the astragalus and calcaneum, sending also some fibros to the fibrous shouth of the tendon of the flexor longue digitorum pedis. The external lateral ligament is round, narrow, very strong, and of great length; it arises from the summit of the malleolus externus, descensis vertically to be inserted into the upper and middle part of the outer surface of the calcaneum. The unierior persons-turnal ligament is attached to the fore part, and near the summit, of the malleolus externus (smaller than the preceding, sometimes divided into two fasciculi, but always regular and quadrilateral, with close and very strong fibres), passes obliquely forwards to be inserted into the anterior edge of the external articular surface of the astragalus. The pasterior persuco-turnal ligament passes obliquely downwards and inwards from the depression which exists behind the external malleolus, to the posterior part of the estragalus, towards the outer edge of the gruove for the tendon of the flexor longus pollicis pedis; its fibres are numerous, and are divided into distinct fasciculi. The tibin-tarsal ligoment is an assemblage of some irregular fibres, which do not form a distinct fasciculus, immersed in adipose cellular tissue, and covered by the tendons of the tibinlis anticus, extensur propries pollicis, and extensor communis digitorum : they descend obliquely from within nutwards, from

the asterior part of the tarsal extremity of the tibia, to the fore part of the articular pulley of the astragalus. The systemal angule extends over the cartilagmous surfaces of the fibula and tibia, and ascends between these two bones into their inferior articulation; it is prolonged on the interior of the two malfeoli, lines the ligament which we have described, and is reflected upon the lateral articular surfaces, and over the cartilaginous pulley of the astragalus; it is very loose anteriorly and posteriorly, where it is in contact with

a great quantity of adipose cellular tissue.

164. Tursal Articulations. In our description of the tarsal bones, the student will observe that we bave, in many instances, taken the articular surfaces as forming their leading features. The astropalus is articulated with two bones of the tarsus, viz. the calcaneum and scaphoid; and 12 of that with the calcaneum, The posterior enleanes-astrogalies figureal consists of a few parallel libres, which, ranning obliquely inwards from the pesterior part of the astragalus, is attached to the calcaneum. The intercoreans ligament is attached in each bone to the non-articular uneven depression pointed out as separating the two opposing articular surfaces; it is found most readily on the external aspects of the foot; an ample synovial capsule invests the articular surfaces. 20. The astragalus is articulated with the scaphoid (navicular); the opposing surfaces are peculiar, and altogether deserve the particular attention of the student; it is here where considetable movements take place in walking, particularly tending to lengthen the foot. The symuvial eapsule is ample, particularly inferiorly and internally, where it forms a pretty extensive cul-de-sac. The only distinct ligament will be observed to arise from the upper part of the neck of the astragalus, and pass to the upper nonarticular part of the scaphoid. The scaphoid, though not articulating directly with, is still very powerfully attached to the calcaneum by two ligaments, viz. Let, the infersor internal calcaneo scophoid; this is a flat very thick fibro-cartilagluous clastic fasciculus, passing from the anterior part of the small tuberosity of the calcanoum to the inferior surface of the scaphoid; it is lined

superiorly with a reflection of the aynovial capsule between the astragalus and scaphoid, and receives the head of the astragalus in walking, or under heavy pressure; itselasticity under these circumstances produces the phenomenon of the elongation of the foot. The external calcomo-scaphoid ligament, like the preceding, in part supports the astrogaluse its fibres are very numerous, and can only be seen in a very deep dissection. The scaphood or navicular bone may be manidered as a keystone to the arch which the well-formed foot (particularly in the female) presents, it touches all the bones of the tarsus excepting the calcaneous to which, however, it is connected by the important and very beautiful structure we have already mentioned, viz. the inferior, internal calcance-scaphoid ligament. The rounded head or convex articular surface of the scuphoid, presents three articular surfaces, and supports in succession the internal, middle and external consilorm bones; these conesform hones are also articulated with each other, but one synovial capsule answers for the whole; the linewents are named dorsal and plantar from their situation. and are short but strong fasciculi attached to the nonarticular surfaces so carefully pointed out in our description of the bones. The cuboid bone arriculates with the calcaneum, external munciform bone, and supports the fourth and fifth metatarsal bones, a similar arrangement of flat aponeurotic fracteution the dursal aspert partieularly, connects the cuboid to the surrounding bones and to the metatarsal. The cuboid is also strongly attached to the scaphoid by a kind of interesseous ligament, seen only when the dissector is disarticulating the foot. On the plantar aspect, the ligaments connecting the calcaneum to the caboid, are thrown prominently into view on account of running along the outer margin of the foot; the more superficial filaments are of great length, being prolonged over the cuboid, and uttacked to the proximal extremity of the third and fourth metatureal bones. The Inferior and Superficial Calcumo-Caboid Ligament, (Ligamentum Longum Planno), is the largest and strongest of the ligaments of the foot; its thickness, pearly lustre, and the longitedical direction of its fibres are very remarkable; it

arises from the posterior and inferior part of the calcancum, and passing directly forwards, terminates in part at the oblique tuberosity observed at the inferior surface of the os cubrides; the rest of its fibres, which are much longer than the others, pass below the fibrous sheath of the peroneous lungus, and divide into several fiscicali which go to the posterior extremity of the third and fourth metatursal bones, and give insertion to muscular fibres; this ligament corresponds below to the desp-scated muscles of the sole of the fact. The Informer and Deep Calemana-Culmid Ligament; this ligament, which is shorter and situated higher than the preceding, and separated from it by a great quantity of adipose willular tissue, arises from the calcaneum before the superficial ligament, and proceeding a little inwards, is inserted a holly into the tuberesity of the us cuboides. The Symmal Membrane is sufficiently simple, as it only covers the two cartilaginous surfaces; upper, and inferior deep ligaments between the calcaneous and enboid hone; it is seen exposed in several of the interstices. In the former; externally, corresponds to the sheath of the peraneus longus, and internally to a fibrous and cellular tissue:

165. Tarm Melaturnol and Melaturnal articulations. The metatacsal hones are five in number, and are articulated in a very secure manner with the three coneiform and cuboid of the tarses; the articular surfaces are flat, admitting of little motion, but at the same time so fashioned as to contribute greatly in forming the arch of the font. The symuvial capsules are four in number, and the ligaments are placed on the dersal and plantar aspects. The plantar ublique cuncu-melatural ligament (remarkable for its strength.) runs from the anterior part of the base of the first cunicform bone to the second metaursal. The other tarso-metatarsal ligaments are either dornal or pleadur, and, as in the hand, named from the bones which they connect. The distal extremities of these five metatarsol bones are connected together by the transverse metaturant figumeet; it is placed on the plantar aspect, and though strictly analogous to that described in the hand, differin connecting that of the grow tue to the others.

166. Metatera-phalaugest and Phalaugest articulations. The phalauges of the toes are in number, form, and articulations precisely like those of the fingers; they are much smaller, however, and the ligaments are consequently minute, requiring great care in their dissection; their arrangement is precisely similar to that observed in the hand.

DISLOCATIONS.

167. Dislocations of the Spine, in any part of the column, unaccompanied with fracture must be very rare, since no instance occurred in the extended experience of Sir Astley Cooper. We have examined about six fatal cases of dislocation of the cervical vertebrae, but they were all complicated with fracture of some part or other of the vertebras themselves. Nevertheless, the authority of Sir Charles Bell is in favour of the opinion, that a dislocation may happen in the neck, unaccompanied by any fracture, and Mr. Liston states, that one case of complete and pure dislocation in the cervical region of the spine, occurred to him. Displocoucul, Mr. Liston remarks, may take place without producing any very serious consequences; two cases occurred to him; one, a boy who fell over a high rock, the other a woman who fell from a window, both lighted on the breech, and the trunk was best forward. The lad remained stout, but his trunk was deformed by an excurvation; the woman recovered perfectly, "In these cases there was evident laceration of the interspinal ligaments, though, probably, not of the ligamenta subflava, for the spinal chord must be stretched or otherwise injured when these are torn." The fracture of the processus deutatus, is an accident usually enused by caries of the bones, either originating in the sides of the atlas, and enusing the transverse ligament to give way, when almost instantaneous fatal results follow; ur at the root of the odontoid process, in which case the individual, it would appear from the cases on record, colors a precarious existence for some time. When dislocations with fracture happen above the third cervical vertebra. this accident is also almost immediately fatal; this is ascribed to the origin of the phrenic nerves being implicated by the arcident. Fractures, with dislocation. lower down in the column, are not so immediately fatal, but life is often prolonged for a considerable period. The severity of the symptoms following dialogation with

iracture in various parts of the spine, is pretty nearly in the ratio of their height, those nearest to the head being always most dangerous. The more ordinary symptoms of these accidents are loss of sensation at most points below the injury, retention of arise, cruetion of the penis, irreduntary discharge of the feers, terminating at last in death, but not unfrequently after the expiry of a period extending to ten or twelve munths.

166. Disbordam of the Ribs, most practical surgeons seem to think impossible, unless accompanied with fracture; the handing of the rib being a mere consequence of the fracture. The parties of the sternum in young

persons may suffer displacement.

166. Dislocations of the Peleis have not been met with by practical surgeons without an accompanying fracture. The natural security given to the skeleton here is truly wonderful, as the application of great vinlence is necessary to the production of either fracture or dislocation. A person falling astride on a hours. Mr. Liston remarks, may preduce partial diastasis of the symphica pubis. We have had an opportunity of examining the privis of four females who had died during or soon after delivery. " In one female subject (we quote from muce taken at the time of dissection.) who died on the second day after delivery at the full term, we had an apportnaity of verifying for the fourth time a fact we had previously noticed, viz. that in all those who die soon after delivery, the symphysis pulsis is not only moveable, but the hours may be separated from each other to the extent of about half an inch. The sacro-time joints were also movemble in all. As it might be supposed (and some have said so,) that this may calle condition of those joints is rather a diseased condition, and not the usual state of the pelvis during and soon after delivery, we have to remark, that in name of these persons was the pelvis unusually small, neither was there the slightest appearance of disease in any of them. The measurements of the pelvis, in one case, were unusually large. From these considerations we feel disputed to think, that there occurs at every delivery a relaxation to a greater or less extent of the symplysis pubis, and likewise of the sacro-iliae joints."

Carpendy formers

170. In dislocation of the Lower Jaw, both condyles are most frequently dislodged. This can take place only in one direction, siz. farwards into the temporal fosse. The needent may occur from over opening of the jaws, or from powerful museular action during depression of the lower jaw alone. The accident is recognised by the mouth remaining widely open, the chin being depressed downwards and backwards. The partial luminous of the lower jaw is distinguished by the chin being thrown to the opposite side of the luxation, and the incisive teeth are no longer in a line with the axis of the face, Sublandion of the jaw is not unfrequent in cases of great relexation. In this case, the jaw passes in front of the inter articular cartilage, but is usually reduced without the aid of the surgeon.

171. The Sternal End of the Clavicle, not vithstanding its apparent mobility, is but rarely dislocated. When dislocation occurs, the extremity of the bone passes in front of the sternum, and is easily felt. The accident is generally produced by violence applied to the point of the shoulder; the anterior sterno-clavicular ligament, must either give way, or the end of the clavidle is pushed through it. The reduction is troublesome, and soldom satisfactory, generally leaving permanent deformity. The presence of the sterno-clavicular fibro-partilage, and its very complex acticular relations, may be sufficient to explain the difficulties which the surgeon encounters here in his practice. The scapular extremity of the clanicle is presty frequentby displaced. The extremity of the clavicle generally rises above the aeromion and the ligaments injured are the superior aeromio-plavicular, and in severe cases, the coraco-clavicular (consid and trapezoid) ligament is turn, in which case the end of the clavicle not only rises, but projects, pushes out the deltoid muscle and produces flattening of the aboulder; the arm falls forward. The reduction is effected by raising the arm and carrying the scapula backwards. The cure is seldom or never complete, a slight projection of the clavicle always remaining, even in the most experienced hands.

172. In dislocations of the Shoulder-Joint, it is the head of the humerus which quits its situation, and the direction which it takes is most community towards the axilla. The dislocation is in almost every instance produced by violence applied to the distal extremity of the humerus. The capsular ligament, and its synovial capsules are lacerated; the long tenden of the biseps mustle must in all cases be very much stretched or torn. The mobility of the joint and apparent basity of the rapsular ligament, have led some surpremi to think that dislocation might occur without laceration of the ligament, but this idea must have arisen from circumsurihed views, or a want of experience; the joint and its capsular in truth only lay in the dead body, who all the capsular muscles have been removed. When dislocation has taken place, the shoulder is distorted and a depression is evident under the acromion process. The albow cannot be brought close to the side without

great suffering to the patient.

178. Dislocation of the Ellow Joint is not uncommon, and owing to the number and extreme complexity of the articular surfaces and ligaments entering into the composition of this joint, it is perhaps the most trying and troublesome case which a surgeon can be called upon to treat. Great numbers of persons amount the poorer classes are sust with, who have veceived injury in this joint, and not being able to procure proper medieal aid, carry about a dislocated and comparatively useless arm all their lives. The accident is most common in young persons, whilst in fact the bones are neither fully formed, and whilst all the extremities of the hones entering into the composition of the joint are in the state of opiphysis. The most common luxation is a displacement of the hones of the foreurn backwards. usually tending slightly towards the ulnar side. The coronnid process places itself in the cavity for the reception of the ologramon, and the head of the radius places itself behind the external condyle of the humerus; the arm is shortened and remains in a slightly flexed state, between pronation and supination; all attempts at movement are extremely painful, and the slightest flexion is impossible. Great swelling rapidly takes place after the aggident, and now the surgeous knowledge of anatomy is put fairly to the test. Delays here are not to be allowed, as the parts very rapidly aerommodate themselves to their new situation. The ligaments most materially injured, will be the auterior and

pasterior, but these are thin and very loose, so that these and the muscles, particularly the biceps and brachialis, will be either very much stretched or even torn. In reducing this dislocation, extension must be made, and then the forearm bent, the surgeon at the same time placing his thumb on the anterior aspect of the extremity of the humerus, and his fingers posteriorly on the displaced extremity of the ulna thus pushing them into their proper position. In sinut persons, the reduction may require considerable fores, and the surgeon should in this case apply extrasion and counter-extension by placing the patient on his face on a couch, the surgeon then lays hold of the patient's wrist with both lands, and placing his heel against the axidary margin of the scapula acquires great power over the arm, and can covarquently graduate that power to what extent be

pleases.

174. The Radius alone may be dislocated, the displacement being backwards on the outer usualyle. We have had an opportunity of examining a case of this kind of very long standing; the head of the radius rolled on the outer condyle, and projected under the integuments which were thin and much altered in texture. The bone was found on dissection to have made its way through the origin of the extensor muscles, and to be surrounded by a kind of aponeurotic ring of great strength; the head of the radius was much rounded off, and the articular surface of course completely changed, and the ligaments were changed evidently by inflammation and subsequent wasting, to such an extent as not to be made out. The whole arm and hand ups evidently deformed in consequence of the accident, and presented the very characteristic twisted appearance mentioned by practical surgeons. The mevements of the joint were free. The radius is sometimes displaced formards, and the eleformity is considerable when the arm is extended. The ligaments torn in a case of this kind must be numerous and important, particularly the annular ligament of the superior entito-radial articulation; the anterior ligament of the elbow joint will also be partially incerated. By observing the very evident, and we might almost say mechanical purpose of the unnular ligament, the discretor will perceive the cause of the difficulty encountered in effecting a good cure in dislocution here. We remember assisting Dr. Barelay in reducing a case of dislocation of the radius forwards, in a fine little boy of about seven or eight years old: the bone was replaced with great case, and the patient gave it all manner of fair play afterwards, but notwithstanding he returned in about a week with the head of the radius as much displaced as ever; its reduction was again very easy, but it was now evident that it as readily quitted its proper position with the slightest movements, of the arm.

175. The West Joint is rarely dislocated; when it occurs, it would appear from the writings of practical surgions, that they consider the hones of the forearm to be displaced, but we should consider that it must be those of the earpus which most generally suffer displacement. Thus, in falling on the hand, the carpus will be driven up either before or behind the extremities of the radius and alon, but in accidents of this kind, the Image of the cargos thomselves are commonly fractured. A sudden wrench may throw the carpus behind the radius, when the extremity of the radius will be most rendily felt riding over the upper and extensor aspect of the carpus, and will thus appear the displaced bone. The figurents laperated will be the anterior and posterior radio-corpel, and in all probability the external lateral ligament. When the accident occurs in consequence of a fall on the palm of the hand, both bones of the foreurn project on the extensor side, whilst those of the carpus will be found under the flexor tendons. The reduction is easy, but the treatment is not so. Extensive largeration of ligaments, and even tendons, must have preceded the displacement of the bonesinflammation is sure to supervene, and the treatment will more resemble that required for fracture than sinsple dislocation. We have seen the extremity removed in a campound dislocation of this sort, where the vessels and nerves had suffered very slightly, and certainly disl not necessitate amputation, and the case will in all probability be brought before a Jaro; although for ourselves we know of only two or three practical surgeons in Britain who could give any thing like a sound judgment in the mac.

176. The Carpal benes, notwithstanding their admicable form and arrangement, are sometimes displaced. The displacement is generally toward the back of the band, and the displaced bene is generally quite loose and moveable; extensive loceration of the ligaments, which are short and powerful, must have taken place, and although the bone is in general easily replaced, yet displacement sooner or later again takes place. The metagraph bones have not been observed to be liable to simple dislocation.

177. The Fingers are sometimes dislocated. The proximal and distal phalanges are the boxes most commonly displaced; their extremities resting on the dorsal extremities of the corresponding boxe. There is really no posterior ligament in these joints, and the displacement therefore laverates few parts. The respection

is easily effected by extension and coaptations

178. The Thomb, however, is liable to a variety of dislocations, and they have given rise to a deal of argument amongst sargeons. Their treatment is in truth, difficult, and the thumb is of great importance to the individual, very slight displacement rendering the whole hand comparatively useless. In cases of dislocation, the base of the proximal phalaux is thrown backwards upon the distal extremity of the metacarpal bone; the thumb is shortened, deformed, and almost immoveable. The base of the bone, (there being no ligament to oppose its passage backwards,) gets displaced, and the lateral ligaments (which are strong,) are thrown into a state of complete tension; and cases have occurred where it has been deemed advisable to divide the external of the lateral ligaments. The joint was by this means preserved, and no deformity followed. The carpo-metacarpal articulation of the thumb has also been seen dislocated; in these cases the metacurpal bane is the one displaced, being thrown inwards towards the palmar aspect, between the trapezium and root of the metacarnal bone supporting the forefinger.

179. In dislocation of the Hip-Joint (Com-Feweral Articulation): it is the head of the femur which suffers displacement, and this may take place in four different directions. Ist, Upwards and backwards, the head of the femur lies on the dorsom of the ilium; the limb is shortened from one to two and a half inches, the toes are turned in, the thigh is slightly bent upon the pelvis, and firmly fixed; the capsular ligament and symvial

capsule will be lacerated, and the inter-articular ligament (ligamentum terer) will have been torn across, 2d, Displacement forwards; the head of the femur rests on the body of the publs; the ligamentons and synovial capsules will be lacerated, but the inter-articular ligament may except unless the displacement is great; the limb in this case is not much shortened, and the toes are eyerted or turned outwards; the head of the femus may be seen and felt prominent in the groin; the injury is attended with much distress, a paralysis of the limb sometimes supervening; the femoral vessels and nerves are stretched over the head of the femur-3d, Displacement downsnards; the head of the femur gets upon the obturator membrane; the ligamentous and synovial capsules will of course be lacorated, but the inter-articular ligament may escape; the limb is elongated considerably, and advanced outwards; the trochuster major is depressed, and the whole extremity immoveably fixed. 4th, Displacement backwards; the head of the fesnur gets into the greater sciatic notels; the ligamentous and synovial capsules will be extensively laperated, and the inter-articular ligament will in all probability be also torn across; the limb is slightly shortened, and the toes are turned inwards in a very remarkable manner. Morbur cororius and simple fractures of the neck of the femur and trochanter often give rise to very similar symptoms and displacement, so that the anatomical knowledge of the surgeon is often put to the test in cases of this kind. Sir A. Cooper remarks that it is scarpely possible to unistake between the effects of disease and recident, as the history of the case will at once point out its nature. We mk who ever received a covrect history of morbus coxarius from their patient?

180. The Kere-Joint (Femoro tibial articulation) Ste A. Cooper states, can be dislocated in four directions, two of these are incomplete and letteral, the others are perfect loxations, the tibia being displaced backwards or forwards. In descenting the ligaments of the knee-joint, the student will find that the contour articular surfaces are kept very closely together by means of the ligaments, and unless in very relaxed habits, can scarcely admit of dislocation without such extensive accompanying injury as to render the joint ever after

uscless. Mr. Liston states accidents of this kind to be of rare occurrence, and when they do happen, as sooner or later requiring amputation in consequence of the great laceration and injuries necessarily accompanying the displacement. Sublimation arising from luceration of the internal lateral lignment is not unfrequent; it occurs mostly in females, and is easily reduced, but requires an apparatus to be worn by the individual for the subsequent support of the linds. It will of course be the tibin which will suffer displacement in all these cases. The patella may be dislocated laterally. This may occur without laceration of any ligaments, and is readily recognised and easily reduced. A pseuliar laxity of the entire apparatus about the knee-joint sometimes exists, and requires the support of a well-fitted knee-cap.

181. The Ankle Jaint (Tibia-Tarsal Articulation) is so constructed as to render simple dislocation without fracture nearly impossible." Sublazation or sprain not unfrequently happens; the foot may be luxated forwards or backwards, and even here, if the displacement is great, one or other of the malleoli will be found fractured. The Tarsal hones may be displaced; the astragalus is sometimes pushed completely out of its situation, passing either to the dorzen of the foot or backwords; although the ligaments torn and moury done to the whole apparatus of the joint must be very great, yet we cannot agree with those surgeons who propose the immediate removal of the displaced bone. Mr. Liston does not approve of the removal of the bone, and we ourselves have seen a case where the astragalus had been displaced forwards, and thrown on the dorsum of the foot, in which, although the deformity was permanent it was not great, and the use of the limb was scarcely If at all interfered with a the individual was in the habit of performing very long pedestrian exempsions. Mr. Liston records a case where the astragalas was thrown backwards, in which he allowed the bone to remain. having in vain attempted its reduction, and the limb in a few months was as useful as ever, little deformity resulting from the areident.

182. The articulations of the first are solden disloused by accident; but we think subfuration and con-

The home assully fractured is the fibula, about two melies above the joint.

siderable displacement is often produced by ill-made shoes, particularly in the first metatarso-phalangeal articulation, or that of the great toe. The toe is turned outwards, either above the second toe or below it, and the rounded distal extremity of the first metatarsal bone projects (though not the bone actually displaced) to a greater or less degree, causing in some cases very great deformity; and we suspect, in consequence of an orroneous diagnosis, leading to a very great deal of

had surgery.

183. We cannot copelede our very imperfect observations on disjocations, without extracting a single remark or two from the splendid Treatise on the subject by Sir Astley Cooper. Sir Astley defines a simple dislocation to be " a displacement of the articulatory portion of a bone from the surface on which it was nuturally received." A compound dislocation " is that in which not only the articulatory surfaces of a bone are displaced, but also in which the cavity of the joint is laid open, by a division of the skin, the ligament, and the synovial membrane." A considerable share of anatomical knowledge (Sir Astley further remarks,) " is required to detect the nature of these accidents, as well as to suggest the best means of reduction; and it is much to be immented that students neglect to inform themselves sufficiently of the structure of the joints. They often dissect the muscles of a limb minutely, and then throw it away, without no examination of the ligaments, a knowledge of which, in a surgical point of view, is of infinitely greater importance; and from hence arise the errors of which they are guilty, when they embark in the practice of their profession. Even our hospital surgeous, mistake these accidents, for I have known the pullies applied to an hospital patient. in a case of a fracture of the neek of the thigh hone, which had been mistaken for a dislocation. It is therefore proper that the form of the extremities of the bones, their mode of articulation, the ligaments by which they are connected, and the direction in which their most powerful muscles act, should be well understood." These opinions were recorded in 1822, and we are sorry to add, that the reports of surgery prove their reprint in 1837 most essential.

PART III.

DISSECTION OF THE MUSCLES OF THE BACK.

184. The dissection of the muscular system should almost uniformly be commenced on the back. The subject being placed on its face, a block of moderate beight under the centre of the thorax, and a second under the abdomen, the students engaged in this dissection (generally three on each side) should make an incision through the integuments commencing at the external occipital protuberance, and terminating at the lower end of the sacrum; from this long meision carry one out laterally from the external occipital protuberance to the back of the external car; a second from about the first dorsal vertebra to the acromion scapulae; a third across the trunk, commencing about the ninth or tenth rib; and a fourth from the termination of the long incision at the bottom of the sacrum. around the crest of the Heum as far as nearly to its superior and anterior spinons process; these incisions should merely traverse the integoments, and that made neross the occipital bone must be made with much caution.

185. The whole region may be subdivided into three parts—its cervical, dorsal, and lumbar portions; accordingly the students dissecting the head and neck, the upper extremity and the abdomen, will all have a share in this dissection, and they night mutually to exist and examine each other's dissections, since nearly all the muscles can from one region to another, so that a part belongs to one and a part to another.

186. The student's next care is to carry the incision at one or two points through the subcutameous cellular membrane, until he sees the museular fibres, and procoed then to clean the muscles in the usual way, by mising the flaps upwards and downwards; this will expose the trapezius and latissimus dorsi muscles, Previous to examining the descriptive automy of these museles, the following points merit attention. The integuments of the back are much denser than over most parts of the body, and this is not peculiar to man, but common to him with most animals. In the neek may be observed a pretty strong ligament (ligamentwice stecker), extending mestally from the external opcipital protuberance to the last cervical and first slorsal vertebran. Of this ligament the student at first sees merely the external posterior margin, for it extends quite down to the spinous processes, to most of which it is attached. It thus forms a septum or division in the neck. between the muscles of the right and left sides, separating them from each other, and affording them some points for their origin or attachment. It also supports the head, and is of great strength in many of the lower animals, passing down the spine as far as the lumbar region, and is then called the par-mar. It is not included in our description of the proper ligaments, but seems to us to be continued down the spinal column. under the name of supra-spinal ligoracut, 2d, From the fifth cervical to the fifth dorsal vertebrae, the tendinous origin of the trapezii are broad, and present an oval figure, to which the very improper name of cervical aponeurosis has been given. It is merely a portion of the tendinous origins of the trapezii. In the loins a broad and flat tendinous surface will be observed, which is usually called the Lumbar fascia; but as the superficial lamina of this lumbar fascia is really nothing more than the tendon of the latissimus dorsi muscle, the student will find it described along with that muscle. During the dissection of the trapexius and latissimus dorsi muscles, the dissector will generally expose the following parts :- Pirst, in the cervical region, the superior portion of the sterno-mustoid muscle; second, in the durant region the best of the scapula, a small part of the rhomboidens major muscle, two or three tendons of

the sacro-humbalis, a portion of the vertebral aponeurosis; and, lastly, a triangular space mesial to the base of the scapula, below the rhomboideus and trapezius, and above the margin of the latissimus derst, in which space he will find portions of the seventh, eighth, and ninth riks, and of their corresponding intercestal muscles, covered only by the integuments and subcataneous cellular substance; this exposed space may be enlarged by throwing the arms forward across the chest, and diminished by the opposite action of bringing the ampule together, towards the spine; third, in the lumbar region there will be exposed the lack part of the obli-

quas abdominis externus muscle.

187. TRAPERSON, thin, triangular, situated at the posterior part of the neek and lack, and at the upper part of the shoulder; the base of the triangle is towards the spine, the apex towards the shoulder. It arises from the inner third of the upper curved line of the occipital home, from the whole laugth of the lignmentum nucles, the spinous processes of the seventh cervical and all the dorsal vertebre, as well as from the supra spinal ligaments by which they are connected. All these origins take place by aponeuroses; that from the occipital bone presents a thin and broad aponeurosis, the fibres of which are frequently more than an inch in length; along the ligamentum number the abres of these aponeuroses are short, but from the sixth cervical to the third dorsal vertebra inclusive, they acquire considerable size, and form a membrane which represents the half of an ellipse; they then shorten again, to be elongated a second time at the lower part of the back. The fleshy fibres sucreed these aponeuroses; those which come from the occipital bone and ligamentum nucles, descend obliquely outwards and forwards, turn upon themselves, and terminate at the outer third of the pusterior edge of the clavicle; those which arise from the last cervical vertebra and the upper dersal are shorter than the others, and proceed horizontally outwards, to be attached to the norsmion, the acremin-clavicular ligament, and the spine of the srapula, by strong appareuratio fibres; all the others, which are the more oblique the lower they are, uscend outwards toward the inner extremity of the

spine of the scapula, and there degenerate into a triangular appromutosis, whose summit is attached to a small tuberosity; this aponeurosis slides, with the assistance of a very losse cellular tissue, over a smooth surface, pointed out in our description of the scapula. This muscle is covered by the skin, from which it is separated by a cellular tissue containing little fat, and denser above than below : it covers, at its upper part, the complexus muscle; farther down, the splenius, levator anguli scapular, and serratus posticus superior; and at its lower part, the supra-spinates, infra-spinates, thomboideus, latissimus dorsi, sacro-lumbalis and longissimus dorsi muscles, and the inner extremity of the spine of the scapula. When the whole of the trapezius contracts at once, it carries the shoulder and clavicle backwards; its upper fibres elevate the tip of the shoulder directly, the lower indirectly; when both trapezii act together, the two scapulæ are brought nearer each other, and carried backwards; when the shoulder is fixed, it extends the head, and inclines it laterally.

188. Larranness Donat, broad, thin, and irregularly quadrilateral, situated upon the posteribr, lateral, and inferior region of the trunk, extending from the lower part of the back to the arm, passing over the inferior angle of the scapula, and the posterior part of the axilla. The greater part of its fleshy fibres are inserted along the outer edge of the lumbar facia, which is contracted at its upper part, but very broad below, where it is incorporated with that of the servatus pustious inferior, and the obliques internus abdominis. This aponeurosis, which is formed of fibres interlaced in all directions below, and following the direction of the fleshy fibres above, arises from the last five, six, seven, or eight spinous processes of the back, from all those of the loins and sacram, from the asperities of the sacral grooves, and from the posterior part of the iliac crest, and iliac protuberance, where it is continuous with aponeurotic fibres of the glattens maximus and sacre-humbalis." The

Many anatomists, and we are of the number, prefer virging the superficial layer of the lumber facia, as seen on removing the integranents, simply as the tenden of the latissimus dorn muscle, and in that case we describe it as arising from the same origins as

other firshy fibres of the latinipus doral come from the outer surface of the last three or floor ribs by digitations, as first aponeurotic, which are half the one over the other so as to present an inforiented appearance from above downwards, and which are interfaced with digitations of the obliques externos abdominis, with which they form a pretty acute angle. After thus commencing, the fibres of the muscle, which are su muchthe shorter and less oblique the higher they are, murverge and proceed to the lower angle of the scapulawhere the muscle presents little breadth, but much thickness, and often receives a small fleshy bundle from the scapula; then contracting considerably, it continues its progress upwards and outwards, at first applied upon the teres major, it afterwards turns round it, so as to be nearly covered in its turn by that muscle. its attachment to the homeros, the fleshy fibres of the latissimus dorsi give rise to a tendon about three inches long and an inch broad, which erossing the direction of the teres major, is at first contiguous with that tendon, separated from it only by cellular tissue, and afterwards by a small synovial capsule, it generally unites with it at last, to be inserted at the same time into the posterior lip of the locipital groove. An aponeurotic band about two lines broad, desermin from the small tuberosity of the humerus to these tendons, which send out from their lower edge another fibrous expansion which throws itself into the bracklal aponearosis, and some foundles which line the bicloital groove in conjunction with the tendon of the poeteralis major. This muscle is everywhere covered by the integraments, excepting at its upper and inner part, where the trapezina overlaps it. The muscle itself covers the oblique muscles of the abdomen, the accratus postions inferior, sagro-spinalis, levatores costarum, the inferior intercostal muscles, the serratus anaguus, rhomboideus, teresmajor, infra-spinatus, the lower ribs, and the inferior

we have now given in the facia. The only difficulty concentrate in taking this view, is, that the resilients origin of the according poticus inferior, and one lamins of the transverses alchomote will be found inseparably connected to it, and thus we have to speak of it as being composed in a great part of those terminas.

angle of the scarmin. The auterior surface of its tendon, united with that of the teres major, is in connexion with the axillary vessels, the brachial plexus, and the corneo-brachonic. The posterior is contiguous to the upper and inner part of the humerus, where a thin synovial capsule facilitates its motions. The latissimus dorsi carries the arm backwards by lowering it, and making it turn upon its axis from without inwards. It also draws the tip of the shoulder backwards and downwards. It applies the inferior angle of the scapulaagainst the thorax, and brings the arm strongly against the walls of that cavity when it acts simultaneously with the pectoralis major. When a person is suspended by the hands, and an effort is made to raise himself, it pulls the trunk upon the arms. By taking its fixed point upon the humerus, it can also raise the rife to which it is attached, and thus become a muscle of inspiration.

189. Let the student next cut through the trapezius, commencing at its lower margin, and opposite to the angle of the scapula; let him carry this incision to the spine, and then upwards to the occipital bone, taking care to clean the rhomboideus major and minor as the trapezius is being removed, otherwise it cannot be done well, the cellular membrane investing these muscles being very delicate. Some, however, prefer cutting the trapezius directly across the middle, at about the distance of an inch and half, or two inches from the spine, leaving a small part of its exterior margin; this may afterwards be found of use in studying the surgical anatomy of the neck. The latissimus dorsi should be out where it lies over the more prominent part of the ribs. A very extensive dissection follows the raising of these two muscles.

190. Ritoscorours, (major and minor,) broad, flat, nearly square, accupying the upper part of the back and lower part of the need. It is divided by a cellular line into two portions, which have been considered as distinct muscles; of these, the upper is smaller, the lower larger. It arises by apaneurotic fibres, longer below than above, from the lower part of the ligamentum nuclin, the spinous process of the last obviced, and the first four or five dorsal vertebra, and from the corresponding supra spinal ligaments. The

fleshy fibres, which are all parallel, descend a little outwards, to the spinal edge of the srapula, where they are attached superiorly and inferiorly; but in the middle, they are juserted along an aponcurotic area, vertical and parallel to the edge of the scapula, with which it is only connected by its two extremities, being separated from it in the rest of its extent by cellular tissue traversed by vessels. The posterior surface of the rhomboldens is in a great part envered by the traperius; interiorly it is covered by the latissimus storal. and between these two muscles, is in contact with the skin. The underior surface covers the serrates posticus superior, the splenius, szero-spinalis, and part of the interpostales externi; it is also applied over some of the ribs. Its upper edge is covered, in nearly its whole extent, by the levator anguli scapular. The rhomboldens in action brings the scapula toward the trunk, and in this way the rhomboid mescles of the opposite sides draw the shoulders forcibly towards each other; it also loners the tip of the shoulder, by bringing the lower angle of the scapula toward the vertebral column: These muscles may now be detached from the spine and ligamentum nuclear great caution must be here used, otherwise the dissector will most certainly also raise a muscle which lies below it, vir. the serratus postions superiur,

191. LEVATOR ASSULT SCAPPLE, long and thick, situated at the lateral and posterior part of the neck. It is attached to the posterior tubercles of the transverse processes of the first three, hour, or five cerviral vertebre, by as many small tendons, frequently united with the splenius and scalenns postions. Kach of these tendens gives rise to a fleshy bundle; that of the atlas is the longest and thickest; the others become more slender as they are more inferior. They are at first isolated, but unite below into a single bundle, which descends obliquely backward and outwards, to he inserted by short tendinous fibres, into the posterior. angle of the scapula, and the inner part of its upper odge. Its outer surjuce is covered at its upper part by the sterno-cleido-mustoidous, in the middle by the skin, and below by the trapenies. The issues is applied upon the serratus postions superior, szero-lumbalis, transversalis colli and spherius. Its posterior edge covers a portion of the upper edge of the rhomboideus. This musele in action raises the posterior angle of the scapula, at the same time depressing the shoulder. When it acts to concert with the trapezius, the shoulder is directly raised. It may also incline the neck to its side, or fix it in the erect position, when it acts in conjunction with its fellow.

192. SERRATUS POSTICUS SUPERIOR of an irregularly quadrilateral form, flat and very thin. It is uttached to the lower part of the ligamentum nucles, to the spinous processes of the last pervicul, and two or three of the upper densal vertebra, by a very delicate aponeurosis, extending to the half of its length. The fibres of this aponeurosis are parallel and directed obliquely from above downwards, and from within outwards; the fleshy fibres follow the same direction, and separate into four or five digitations, which are attached to the outer surface and upper edge of the second, third, fourth, and fifth ribs, outside their angles. The psuferior aurface of this muscle is in connexion with the rhombnideus, angularis seapalæ, serratus magnus and trapezius. The auterior is applied upon the splenius, longissimus dursi, transversalis colli, sacro-lumisalis, the ribs and external intercestal muscles. It raises the ribs to which it is attached, and is consequently subservient to inspiration. It also keeps down in some measure the vertebral muscles over which it passes,

193. Serrator Posteror Inventor. This muscle is exposed by reflecting the inferior segment of the latissimus dorsi towards the spine. It is broader but equally thin, and has nearly the same form as the serratos posticus superior. It is situated at the lower part of the back, and in the lumber region. Arising from the last two spinsus processes of the back, and the first three of the loins, as well as from the corresponding supra spinal ligament, by a broad aponeurosis, with parallel fibres directed abliquely unwards and outwards, which is intimately connected with that of the latissimus dorsi or fescia lumborum; it divides, after a short passage, into four or five distinct muscular bundles. The first, which is broad, is attached to the outer lip of the lower edge of the second floating rile, over an extent of four or five

incless and by its lower burder covers the upper edge of the third. The other three, which become successively parrower and shorter, are attached in the same manner; but are directed upon the ribs farther from the angle than the first, so that the fourth is attached not only to the bony part, but also to the cartilage, of the last rib. Their edges also overlap each other, presenting (to use a botanical phrase) the appearance of imbrication. The superior antiner is covered by the lationisms dorsi. The auterior rests upon the three last ribs, the corresponding external intercostal muscles, and posterior lamina of the aponeurosis of the transversalis abdominis, which separates it from the sucro-lumbalis, longissimus dorsi and transverse spinal muscles. The muscle in action lowers these ribs to which it is attached, and thus contributes to increase the capacity of the chest.

194. Verterral Aporterrors comments the inferior margin of the servatus superior with the upper margin of the servatus inferior. This aponeurosis varies much in strength, and sometimes resembles a continuation of the muscles themselves, composed however merely of aponeurotic fibres. It extends laterally from the spinous processes of the vertebrae to the angles of the riles, and thus binds down the great crooter muscles of the spine.

195. Splusius (Musculi Splenius Capitis, et Splenius Colli.) This muscle is exposed by reflecting towards the shoulder the whole of the trapexius and that portion of the sterno-mastoid which is attached to the superior curved line of the accipital bone. The dissector must be careful here not to encrouch too much on the lateral aspeets of the neck, otherwise the important dissection of the anterior aspect of this region will be destroyed. The splenius is an elongated, flat, but thick musele, broader above than below, situated obliquely at the back of the neck and upper part of the back. It arises by aponeurotic fibres, which are longer below than above, from the spinous processes of the first five or six dursal vertehrm, from their interspinal ligaments, from the spinous process of the last cervical vertebra, and from the lignmontummedae as far as the third pervicul vertebra. From these different points of attachment, the fleshy tibresarise, which form a bundle whose thickness and breadth continue to increase as it weedes from them. It ascends outwards, leaving between it and its fellow a triangular interval, in which the complexus is seen. At the middle part of the neck, it separates into two portions. The lower and outer of these, (splenies certicis,) is narrower, and is uself divided into three small bundles, which are attached by an equal number of thin and slender tendons, longer internally than externally, to the transverse processes of the three upper cervical vertebras. The other portion, which is superior and internal, is called the splemus capitis; it is larger, continues to ascend, and terminates, by short aponeurotic fibres, at the outer half of the rough impression between the two curved lines of the occipital bone, at the mustoid portion, and the whole puter edge of the masteid process of the temporal bone, below the insertion of the sterno-cleidomastandeus. The pasterior swrface of the splenius is covered above by the sterno-cleido-mastoideus; in the middle by the trapezius and levator anguli scapula; below, by the serratus postious superior, and rhomboideas. The anterior surface lies upon the complexus, longissimus dorai, truchelo-mastordeus and transversalis colli. In action it extends the head, inclining it laterally, and if only one muscle acts, say the right, it will turn the face to the right shoulder. When the two muscles act together, they extend the head directly.

196. The muscles filling the vertebral grooves may now be examined; the various accounts of them given by a variety of anatomists, from Winslow to Portal, and even later, have greatly tended to confuse this part of the subject, so that there are few anatomists who can describe them, and very few surgeons who understand them: this ignorance has greatly influenced the surgieal treatment of spinal disease, and spinal curvature, reducing it throughout the kingdom to the most deplorable empiricism. The atudent will do well not to negleet these museles; upon a good anatomical basis he can alone found a correct physiology, and this again is the only secure basis for the practice of physic and surgery. The splenius will be best raised by cutting across its spinal attachments, and reflecting it outwards. In the lumbar region the broad lumbar facia will be divided by a longitudenal incision carried within half an

inch of the mesial line. Reflect the outer part of this fascia fully, and now observe that it is really composed of three layers inseparably connected; the most superficial is the broad expanded tendon of the latissimus dorsa, next that of the serratus postions inferior; and, lastly, the pusterior of three divisions, into which the posterior tendon of the transversus abdominis muscle divides unthe external margins of the sacro-lumbalis and quadratus lumborum muscles. The muscles thus exposed extending throughout the entire length of the spine, may be considered as the third layer found on the dorsal aspect of the body. A quantity of very delicate cellular substance, with numerous vessels and nerves, must be dissected from aff the muscles, and the whole range viewed as composed of three great divisions, viz. a lumbo-sacral, a dorsal, and a cerrical. The spinous processes of the vertebrae and ligamentum muchas occupying the mesial line, divides the right from the left side. The dissector will first examine the lumbar portion. He will first observe the common origin of the sucretumbulis and langingimus durai marcles. They are inseparably united with each other as high as opposite to the last rib, and they are also united close to the spine, but towards the upper part of the lumbar region, to the spixalis dorsi, which muscle we shall describe Tracing the sacro-lumbalis (the more afterwards. external of these muscles) opwards, to about the middle of the dorsal region, the student must next separate it cautiously and carefully from the longissimus dorsi, and on its inner side that is nearest to the longissimus dersi, he will find a series of small muscles running in the opposite direction, but firmly attached to the sacro-lumbalis; these are the murculi accessorir. Still higher up in the neck and upper part of the thurax, the student will find on the inner side of the upper part of the sacro-lumbalis, another muscle strictly analagous to the musculi accessorii; this is the expriculis descendens. The student should view all these muscles, viz. the sacro-lumbalis, musculi accessorii, and cervicalie ascendens or descendens, murely as one and the same not of manufes. Their origins, course, and termination are as follows.

197, SACRO-LUMBALIS arising in common with the

longissimis dorsi by a broad, strong, dense, and thick aponeurosis of a white and glistening appearance, formed of fibres interlaced and separated from space to space by openings traversed by nerves and blood-ressels. (Mr. Cloquet includes in the origin of the mero-lumbulis the large fleshy mass lying beneath this aponeurosis, but we do not think this a judicious mode of viewing these musales; these fibres run in a different direction, and more properly belong to another muscle.) This aponeuposis as attached to the posterior part of the lline crest, the sides of the notch which terminates the sacral canal, the whole middle ridge of the sacrum, and to the spinous processes of the lumbar vertebras, more particularly the three inferior ones. From this aponeurosis, both from its superior and deeper surface there arises a fleshy mass, which afterwards divides into the sacro-lumbalis and longissimis dorsi, properly so called. This separation takes place nearly opposite to the last rib; the fleshy fibres constituting the sacro-lumbalis proceed upwards nearly vertically, but a little outwards, and terminate by twelve flat tendons, which are inserted below the angles of the ribs. (Mr. Cloques thinks that the superior five tendons belong to the musculi accessori and cervicalis descendens; this is not a very practical way of viewing the muscle, and moreover we think it to a certain extent incorrect.) These tendens, by being connected to each other, constitute superiorly a thin tendinous aponeurosis. Tracing the inside of the muscle into the cervical region, the student will find the cervicalis ascendens or descendens, arising as it were by tendons from the transverse processes of four or five of the inferior pervical vertebras; these tendons form a series of fleshy bundles seen on the inside of the sacro-lumbalis, which descending through the thoracic portion terminate in a aeries of five tendons, inserted into seven or eight of the ribs, above the angles. These fleshy bundles, described by the older anatomists by the names of musculi accessorii and cerutcalls descendens, are the means by which the sacrolumbalis is continued upwards into the dersal and cervical regions.

198, Longissinus Donsi and Thansvensus Congr. These muscles should be examined together. On the back of the sacrum, the longitudous dural, like the snero-lumbalis, is tendinous, in fact they have a common origin, which has been already described. The longissimus dorsi, being set free from the anera-lumbalis opposite to the last rib, proceeds nearly vertically upwards between the sacro-lumbalis and aplicalis dorsi, elongated, flattened, very thick and square ledind, but slender and pointed above. It divides, as at ascends, into a great number of fleshy tongues termimiting in tendons; these form two distinct raws, one external on the side of the sacro-lumbalis, the other internally along the edge of the spinalis dorsi. The innermost tendens are twelve in number, and are attached to the transverse processes of the dorsal vertebre; the outermost tentions vary in number, being seven, eight, or more; they are attached to the ribs between the tubercles and angles. Having examined this muscle; the student should proceed directly to the dissection of the transversus calls which lies upon its inner and upper part, and has the same relation to it that the cervicalis descendens has to the sacro-humbalis.

199. TRANSVERSALIS COLLE lies on the juner side of the langissimus dorsi, and arises by six small tendens from the transverse processes of the 3d, 4th, 5th, 6th, 7th, and 8th dorsal vertebrar, and terminates by tendons. which are attached to the posterior tabercles of the Ed, 3d, 4th, 5th, and sometimes 6th of the pervical vertebrus. This musele is flat and thin; internal to it are placed the semi-spinulis polli, complexus and truckels mustuideva, with which muscle it is frequently most intimately united, and hence the difficulty the student has in clearly disserting and understanding these muscles. The uses of the sacru-lumbalis and longissimus dorsi are to prevent the vertebral column from yielding to the weight of the organs placed before it; in other words, to crest or raise the trunk, and bend it backwards, when they act in conjunction with those of the apposite side. The uses of the corricults descendens and transcensive will must be nearly similar, excepting in so far that the former is attached to the ribs, which it will meassarily occasionally act on; the latter extends the vertebras of the neck, and inclines them to its own side, if acting singly,

200. The Sermants Donny internal to the longitudwas down, and close to the spine, arises by three or more tendons from the spinous processes of the dorsal vortebree from the second or third downwards; inserted by two or three tendens to the spinous processes of the uppermost lambar vertebrae. The inferior margin of these tendone is generally inseparably united with the common tendinous origin of the longissimus dorsi and sacrolumbalis. There are several circumstances in the history of this muscle which austomical works have negleensl to explain, and hence the difficulty experienced by the student in not merely understanding this muscle, but in the subsequent dissection of all which he near or below it. It In aged persons the muscle seems mostly tendinous, and is so small, that it escapes notice altogether. 2 The lower part is, as has been mentioned, incorporated with the tendon of the langissings dono; these tendons must be artificially separatoil with the knife. About the centre of the muscle there is a fleshy and tendinous slip sent from the longissimus dorsi to the spinalis doesi so uniformly that it may be considered as a constant appearance; little or no notice is taken of this broad and firshy slip by anatomical writers. The student, after examining it, should cut it through, and thus entirely operate these muscles from each other. The two following mustles lie beneath the splenius, but they must be examined now.

201. TRACHERO-MASTORDEUS, situated external to the complexus, on the sides of the neck; long, slender, and flattened, arises from the last four transverse processes of the neck, and two or three of the back, by small-tendons which vary much in size. Inserted behind the masteid process of the temporal bone by a flat toudon. The muscle is frequently intersected by aponeuroses. Superiorly, it covers the posterior extremity of the digastricus and the occipital artery. It inclines the head a little without rotation, or reverses it slightly

when both muscles act.

202. The Complexes, thick, elongated, situated under the splenus, but not entirely covered by it. It arises from the transverse and articular processes of the last four or five certical, and from the transverse processes of the first four or five dorsal vertebrae, by as many small tendons whose fibres are strongly interluced

with the fleshy fibres, and more distinct below than above. To all these tendons succeed the fleshy fibres, which, from being at first disposed in isolated fascicult, are soon intimately incorporated. Those which come from the third, fourth, and fifth transverse processes of the back, form a separate band, which ascends obliquely inwards, and terminates anteriorly by a small tendon, broader at its extremities than in the middle, which accupies the middle third of the inner edge of the muscle, and sends from its upper part other fleshy fibres which ascend to the occipital bone. The fleshy fibres which proceed from the transverse processes of the neck and the two first of the back, ascend less obliquely, and have an aponeurotic intersection in the form of the letter V. more distinct internally than externally, and directed transversely, which occurs about the middle of the muscle and occupies its whole breadth. From the upper edge of this intersection proceed other fleshy fibres which ascend a little inwards, and are attached to the inner part of the impression which is observed between the two curved lines of the occipital bone, by aponeuroses prolonged very far among the fleshy fibres. The complexus, when both right and left act, draw the head foreibly backwards, but when only one acts, say the right, it will turn the face towards the left shoulder, and thus in rather an unexpected manner oppose the splenii muscles. The student should next cut across the complexus and reflect it, remove entirely the spinalis dorsi and longissimus dorsi."

203. Semi-Spinalis Colli, Semi-Spinalis Dorsi, Semi-Spinalis Lumborum. These muscles are called in France the transverse spinal mascles. The cervical portion, which is very strong, (semi-spinalis colli), arises

[&]quot;In removing the latter inferiority, the knife must be carried cautiously through the strong tendinous origin connecting it to the spinuss processes of the lamber and sacral vertains. In doing this he will observe a posterful firstly mass occupying the vertainal and sacral growers which most austomists have considered as a portion of the languages dorst,—but this opinion is condently erraneous; the miscular fibres we speak of are separated only, it is true, by collidar tissue from the strong tendor of the languages dorst and sacro-lumbales, but the muscular fibres run in a quite different direction, and evidently helong to the following system of muscles:

from the spinous processes of the second, third, fourth, and sometimes the fifth cervical vertebrae, and proceeding downwards and outwards, is attached to the transverse processes of the fifth or sixth superior dorsal vertebras. The dorsal portion (Semi-spinalis dorsi,) arises from the spinous processes of the last two cervical vertebre, and three or four of the opperment dorsal, and descending obliquely outwards and downwards, is attached to the transverse processes of the sixth, seventheighth, ninth, and tenth dorsal vertebra. The lumber portion (Scwi-spinalis Lumborum) arises from the spinous processes of most of the lumbar and sacral vertehrse, and descending obliquely, is inserted into the articular processes of the lumbar vertebrae, and into the tubercles of the sacrum which correspond to the articular processes; into the backmost part of the crestailii. This long chain of muscular fasciculi, occupies the vertebro-spinal grooves; strong in the neek, weak in the back, and very strong in the loins : their use is to support the vertebral column generally, and to impress on its separate portions minute actions or motions. Beneath them may no doubt be found a series of muscular fasciculi lying close to the vertebral lamine, to which Steno and Winslow gave the names of multifidus spinor, but it is now generally admitted, that these ought not to be described as separate musules.

204. The INTERSPINALES CERVICES are twelve in number, and occupy, in two parallel rows close to each other, the intervals between the spinous processes of the cervical vertebrae, from that of the second and third to that which exists between the last vertebrae of the neck and the first of the back. Each space contains two. They are so many thin, flat, quadrilateral fasciculi, arising, by short aponouroses, from the sides of the lower edge of the spinous process of the vertebra above, and terminating in the same manner at the up-

per edge of the vertebra below.

205: The INVENTUANSVERSALUS COLLS are small, quadrilateral, thin, flat bundles, placed two and two in the intervals of the transverse processes of the neck, excepting between the first and second, where there is only one. They are distinguished into anterior and posterior; the former are six in number, the latter five. The two muscles of each interval

are attached separately, the one to the anterior, the other to the posterior edge of the groove, which is observed on the transverse process below. They then ascend parallel to each other, and separated by the anterior branches of the cervical nerves, to be attached to the lower part of the transverse process above; these insertions take place by means of short aponeurotic fibres. The asterior inter-transversales colli are covered suterior by by the rectus capitis anticus major. The posterior are covered behind by the splenius, trans-

versalis culli, and sacro-lumbalts.

206. The INTER-TRANSVERSALIS LOMBORUM are all fleshy, and are ten in number, five on each side, resemble the preceding in their general disposition, only they are less distinct, and are not placed in two rows, each inter-transverse space containing only one. The first occupies the interval which exists between the transverse processes of the first lumbar, and the last dorsal vertebra: and the last occurs between those of the third and fifth lumbar vertebrae. Their posterior surface corresponds to the sacrolumbalis; the asterior to the quadratus lumborum. Their lower and appear edges are attached to the corresponding edges of the neighbouring transverse processes, by means of very short aponeurotic fibres.

207. Recrus Caratus Postricus Manue, situated behind the articulation of the head with the vertebral column; attached by short appearances, above the obliques capitus inferior, to the tebercle of the spinous process of the axis, whence it ascends outwards and a little backwards, to terminate in a miliating manner, under the inferior curved line of the occipital bone, between

the rectus minor and obliques superior.

208. Receive Captrix Postricus Mixon, simuled before the rectus posticus majur, and has nearly the same form, but is shorter; attached to the tubercle of the posterior arch of the atlas by a short tendon with radiating fibres, from whence it proceeds nearly in a vertical direction, becoming broader towards the occipital bone, where it is inverted into the impressions observed near its crest, and below its lower curved line, not far from the occipital hole.

909, OBLIGIUS CAPITIS INFERIOR is the strongest of these small muscles, attached by indistinct aponeurotic fibres to the tubercle of the spinous process of the axis near the rectus major; it then proceeds backwards, outwards and upwards, and is inserted to the lower and back part of the summit of the transverse process of the atlas, by means of aponeurotic fibres, which are also indistinct. It impresses a rotatory mution upon the first vertebra, which turns the face to-

wards its own side.

216. Obliques Capitis Superior is situated on the sides and behind the articulation of the head, and is an elongated and flat muscle, narrower below than above. It arises by a small tendon from the summit of the transverse process of the atlas, before the preceding, with which it is a little united. It then ascends backwards and inwards, becoming broader and arrives beneath the outer part of the superior curved line of the occipital bone, and sometimes at the mastoid process of the temporal, where it is fixed between the splenies and rectus capitus posticus major, by distinct aponeurotic fibres. Its posterior surface, which is inclined downwards, is covered by the complexus, the trachelo-mastoideus, and by the splenius, The unterior passes over the occipital bone, the veviebral artery, and the attachment of the rectus capitis

posticus major.

211. The ressels and nerves which occur in the dissection of this extensive region are few and unimportant-In the cervical region, the student will find the posterior branches of the cervico-spinal nerves, the nervusoccipitalis magnus more especially, and a few branches of the spinal accessory supplying the trapezius musels. In the dorsal part of the region, the posterior branches of the dorso-spinal nerves, and in the lumbar and saeral regions, the posterior branches of the corresponding nerves. The arteries and their corresponding veins differ, of course, in respect to the regions of the back in which they are examined. In the neck, the occipital artery and its branches, thep cervical, and some branches of the vertahral; in the back, the posterior branches of the intercostal arteries, and in the long, of the lumbar arteries. The veins generally follow the course of the corresponding arteries. Beneath the chombold and levator anguli muscles, the student will find branches of the posterior scapular artery.

PART IV.

DISSECTION OF THE ARM, (THORACIC, PECTORAL, SUPERIOR, EXTREMITY.)

212. The Anns are connected to the trunk mostly by means of muscles; the clavicle alone articulating with the sternum, and even this articulation is dispensed with in some of the largest animals, such as the horse and elephant, which have no clavicle. The advanced student will require to take a surgical view, not only of the neck, but of the axilla, and he therefore may commence his dissection on the anterior aspect of the body : but the beginner in anatomy has principally to do with the muscles, and we recommend him by all means to disseet first those on the back. Nine muscles connect each extremity to the trunk, of these, five, viz. trapezius, levator anguli, rhomboidens major and miner, and latissimus dorsi, are dissected on the back, and described in Part III. sec 185, &c. To dissect the muscles proceeding from the anterior aspect of the trunk to the arm, the subject must be placed on its back, the shoulders raised by means of a narrow block of six or eight inches in depth, so that the arm may hang freely over the sides of the table, and the head at the same time be depressed. Extend the arm nearly at right angles with the body, and make an incision through the integuments in the mesial line the full longth of the stermum-a second incision from the middle of this, one, obliquely outwards, to the upper and fore part of the arm; two flaps are thus formed which must be dissected, the upper one from below unwards, and the lower from above downwards. The student will do well to make the incisions carefully; in dissecting of the upper flap of integuments, the lower fibres of the platysma myoides, or latissimus colli, will be found embedded in the subcutaneous cellular substance immediately below the clayicle passing over the anterior surface of that bone, and descending a short way towards the breast and shoulder. This muscle will be described afterwards. In the hollow below the deltoides and pectoralis major muscle may be seen the upper or terminating portion of the cephalic vein; this vein should be cleaned and preserved in order to examine it afterwards with the veins of the arm. A little lower down, and not with in reflecting the lower flap of integuments, lies the manmary gland in the female; the male has merely a rudiment of this structure.

213. MAMMARY GLAND. The skin covering the mamme is smooth, soft, and semi-transparent; in the healthy state, no wrinkles or folds can be noticed in them. Towards the central part of each mamma, the skin abruptly changes its colour to a rosy tint in young girls, or a reddish brown one in women who have suckled several children. This circle, where the skin is remarkable for its extreme tenuity, presents a wrinkled appearance, owing to the presence of schuceous glands, and is called the arrola of the sipple. These glands, varying from four to ten, are disseminated over the whole areola, or form a regular circle near its circumference. They present near their summit, two, three, or four small apertures, the orifices of their excretory ducts. They furnish an unctuous fluid calculated to protect the nipple against the action of the saliva of the child. In the middle of the areola is the nipple (popilla), a conical eminence, of a rosy tist, susceptible of a kind of crection during life, and at the surface of which there open the lactiferous vessels. The skin which covers this nipple is wrinkled, reticulated, and furnished with a great number of fine papille. The orifices of the lactifernus ducts, which are observed at its surface, are surrounded by excessively minute hairs. The commonly gland lies in a layer of adipose tissue, before and near the inferior margin of the pectoralis major muscle, it is of an oval form, an irregularly circumscribed base, convex anteriorly, convex towards' the chest; its anftrior surface is uneven, and there are observed upon ir prominences in the form of eldges more or less

reluminous, and depressions in which are ledged pellets of adipose collular tissue. The tissue of the gland results from the assemblage of several lobes or lobules of different sizes, closely connected with each other by dense cellular membrane. These lobes are near each other, and more numerous towards the centre than at its circumference. Each of them is composed of several lobules, themselves formed of rounded granulations of a rosy white colour, and of the size of a pappy seed. The microscope, shows that these grains, themselves so small, are formed by the union of a number of small vesicles. These glandular grains rise to the radicles of the locuferous ducts, which uniting, form twigs and trunks becoming gradually larger. They collect towards the centre of the gland; they are flexuous, very extensile and semitransparent. Those of the different lobes do not communicate with each other, so that there are as many series of visuels as lobes in the gland. They all terminate in sixuses, placed near the base of the nipple, which are commonly from fifteen to eighteen in number. These sinuses have not all the sume capacity; the largest are two or three lines in breailth, while others are not much larger than the trunks which form them. They are short, of a conical form, and connected with each other by cellular tissue. From their summits proceeds a bundle of other canals which occupy the centre of the nipple, do not communicate together, and open separately at its surface. All these vessels are destitute of valves, and Bichat thought them lined by a particular mucous membrane, arteries of the mamma come from the thoracie, axillary, intercostal, and internal mammary. Their deep veins accompany the arteries; others are subcutaneous, and follow a different course. Their nerves are furnished by the intercostal nerves and brachial plexus. Their lymphatics are numerous, and form two layers; they communicate with those of the alsdomen and thorax, and go to the axillary glands. The cellular tissue penetrating and enveloping the mamme, becomes in most cases impregnated with fat, and increases the size of the organ very much. Having attentively observed the position of the mammer, the dissector will clean the whole of the subjacent important muscle.

214. PROTORALIS MAJOR, large, flat, triangular, narrower and thicker externally than internally; situated at the fore part of the thorax, and before the axilla. It arises from the inner half of the clavicle, from the autorior-surface of the steraum, the cartilages of the second, third, and fourth ribs, and over an extent so much the larger the lower these attachments are, from a small part of the bony portion of the fifth rib, and lastly, from an aponeurosis which forms a continuation of that of the abdomen. The clavicular attackment is by short aponesirotic fibres; but the sternal attachment presents long, thin, and loose radiating aponeurotic fibres, interlaced with those of the upposite muscle. Inferiorly, the insertions of the muscles are intermixed with the obliques abdominis externes, and often with the rectus or its sheath. Succeeding these different aponeurotic attachments, the fleshy fibres approach each other, proceeding outwards, and following a different direction. Those of the clavicle: which are the shortest, are inclined downwards, forming a bundle, thick at its commencement, and separated from the rest of the muscle by a cellular line. The muscular fasciculi forming the middle division of the muscle are longer, and proceed horizontally, whilst the lower, which are the longest, proceed obliquely upwards, and approach the more to the vertical direction the lower they are. These fleshy fibres gradually converge toward each other, and the musule becomes narrow and thick at its outer part, it becomes slightly twisted, and gives rise to a powerful tendon which is inserted into the homerns. This tenden is folded upon itself from before backwards, and from below upwards, and seems thus composed of two lamines, placed one before the other, separated above, and united below. The posterior lumina is broad, receives the inferior flashy, fibres of the muscle, which errors the direction of the superior fibres. Above, it sends off an aponeurotic prolongation, which ascends before the bicipital grouve of the humerus to unite, upon the larger tuberosity of that home, with the tendon of the supraspinutus, and it sends into the same groove a fibrous laming, continuous with that deniched from the tendow of the tures major and latinimum domi. The two

laminse of the tenden of the pectoralis major, are at first separated by cellular tissue, but afterwards intimately unite, and are inserted together into the anterior edge of the theipital groove, sending of from their lower edge a considerable number of fibres to the brackial aponeurosis. The anterior rerface of the pectoralis major is covered above by the platysma myoldes, at the middle by the corresponding mamma, and inferiorly by the skin. Its posterior surface covers, from within outwards, a part of the anterior surface of the sternum, the cartilages of the ribs, and a part of their bony portion, the thoracic vessels and nerves, the subclavius, the pectoralis minor, inter-costales externi, serratus magnus, rectus abdominus, and obliquus abdominis museles; toward the hollow of the axilla, this surface is in contact with a great quantity of adipose cellular tissue, with lymphatic glands, the axillary ressels, and the nerves of the brackial plexus : close to its insertion into the humerus, it passes before the coraco-brachialis and biceps, It is separated from all these parts by a layer of cellular tissue, which becomes so much the thicker the nearer it is to the axilla. The inner edge or origin of the pectoralis major is interlaced with that of the apposite muscle as far as the emiform cartilage, and is then gradually lost in the linea alba of the abdomen. Its upper edge is contiguous externally with the deltoid muscle, from which it is acparated by an interval broader above than below, and in which the cephalic vein and some branches of the acromial thoracic artery are lodged in the midst of cellular tissue. Lastly, its inferior edge which is free, is thin internally, much thicker externally and at the upper part, forming the anterior edge of the hollow of the axilla. The pecturalis major has two modes of action; it moves the arm, or assists in respiration by acting upon the ribs; when the arm is hanging by the side of the body, it carries it inwards and forwards; when it is raised, it lowers it; when in rotation outwards, it turns it inwards. Its clavicular portion entering into action by itself, slightly raises the humerus; the opposite effect is produced by its low fibres, which also depress the tip of the shoulder. On the other hand it acts upon the thurax, when the humerus is fixed; it then draws the ribs

and sternum upwards, which renders it a muscle of inspiration. It even raises the trunk upon the limbs, as in the action of seizing the branches in climbing a tree, &c., Raise the pectoralis major by making a circular incision through the whole thickness of the muscle, at the distance of about an inch and a half from its clavicular and sternal organs; reflect the divided portions, and

several parts will be brought into view.

216. Pacronauts Minon, thin, flat, triangular, attached by its base, which is directed inwards, to the upper edge and outer surface of the third, fourth and fifth ribs, by as many thin aponeurotic lamina, continuous with the fibrous plane that covers the external intercostal muscles; the lowest of those digitations is also the largest. From these aponeuroses, the fleshy fibres ascend convergingly upwards and outwards, so that the muscle becomes gradually narrower at the same time that it increases in thickness. Towards the axilla. they form a tendon, attached to the anterior part of the inner edge of the corneoid process of the scapula as far as its summit, where it unites with the coraco-brachialis and biceps. The auterior surface of the pectoralis minor is generally entirely covered by the pectoralis major. Its posterior surface is applied upon the ribs, the external intercestal muscles, the serratus magnus, the axillary vessels, the brachial plexus, and several lymphatic glands. Its upper edge is shorter than the lower, which are both free margins. In action this muscle draws the shoulder forwards and downwards, and carries the lower angle of the scapula backwards. It may act upon the ribs in the same manner as the proctoralis major.

216. Sunct avius Muscue, round, slightly compressed from before backwards, slender at its extremities, which are tendinous, and bulging in the middle which is fleshy; it is concealed by the subclavian aponeurosis. The muscle is extended obliquely at

^{*} Some anatomists have viewed this (exture as a ligament (Ligamentum Bicome, Weithtecht), comes clavirular, commorestal aponeurosis, for &c. It extends from the cartilage of the first rib outwards and upwards to the clavicle and connected process; its lower part is very strong, supporting the while vatermity after the clavicle, &c. has been divided.

the upper and fore part of the thurax, between the cartilage of the first rib and the claviels. It originates from the eartilage and nometimes even from the amount part of the rib, before the costo-clavicular or rhombaid ligament, by a flat tendon, which, after being prolonged behind the flealty body, lusus itself in its interior. It then ascends obliquely outwards and backwards, and is lodged in the groove which is observed at the lower surface of the clavicle. It then terminates by aponeurotic fibres, which proceed outwards to the corass-clavicular ligament, and frequently to the coracoid process itself. The underior surface of the subclavius muscle is covered by the subclawinn aponeuroses and persuralis major. Its posterior surforc is applied upon the axillary vessels and the necres of the brackint plexus; it corresponds to a triangular space, circumscribed by the sterso-cleido-mastoidens and trapezius. Its lower edge is free, and separated from the first rib by the axillary vessels and brackial plexus, over which, together with the subclavian aponeuroses it forms an arch; the opper is fixed to the claviele in its two outer thirds. In action the subclavins lowers and carries forward the claviole; it can also raise the first rib.

217. Dissection of the AxILLA. The first year's atudent should not attempt any more minute dissection of the axilla than merely to examine the position of the great vessels and nerves, and get the demonstrator of the rooms to name them for him. When the arm is extended and drawn from the side previous to any dissection, the student will observe in the angle between them a conical cavity, named the nailla or arm-pit. The inferior rounded margins of the poeteral muscles and latistimus done, as they proceed from the trunk to the homerus, may be felt forming its unterior and posterior boundaries; the servatus magnes and the ribs forming its inner boundary; its open is above and opens into the corrical region between the clavicle, scapula, and first rib; its hear is below and formul of the integuments. This region contains the following important parts, which, upon the section of the pectoral muscles being made, may be examined in

this order. 17. Lymphatic glands (the axillary glands) and vessels, surrounded by much loose cellular substance. 2. The azillary rein, enclosed by a kind of shouth, and overlapping the axillary artery; the vein changes at position on being traced downwards, at first lying over the edge of the first rib, and below the subclavius emuele it gets more in front of the artery as it descends; in its course through the axilla, it is inined by the external thoracic and cephalic veins; infectorly, the subscapular, vena comites, and other veins contribute to form it. 3º. The axillary artery should next be examined, passing over the first rib in a particular groove, behind the scalenus antiens musele; provious to passing the first rib, this artery is called the subclavian; having possed through the axilla, it then gets the name of humeral, whilst in the axilla it gives off the external thoracic arteries, the subscapular and circumber arteries. 4°. Behind the artery in the upper part of the axilla, lies the brackiel please of serves, from which are derived the nerves which ultimately supply the arm with sensibility and the power-of motion. The plexus nearly surrounds the artery, and gives off the following nerves: the external and internal entaneous, the median, ulnar, musculo-spinal, axillary or circumflex and subscapular. All these branches will be particularly described in the section on the nervous system. Towards the lower part of the axilla, two branches of the plexus going to form the median, generally embrace the artery, whilst the external entancers is an its humeral side, the internal outaneous and ulnur towards its inner side; the muscular spiral and circumflex behind; the median rather in front. Across the axilla about its middle, pass the two intermeto-humeral nerves, (humeral branches of the second and third domo-spinal nerves) these come from within the chest, and are generally two in number; the first passes between the second and third ribs, but close to the inferior pargin of the second, the inferior nerve passes between the third and fourth ribs ; there is sometimes a third. The lymphatic glands reenive small blood-vessals, and are moreover connected to the margins of the pectural muscles, but sluy do not occupy any particular space. The removal of those lying on the edge of the subscapular artery requires

the greatest attention in the living body. Having carefully examined the axilla, next proceed with the dissection of the serratus magnus. Saw through the clavicle about its centre; cut through the axillary artery, vein, and plexus of nerves, about an inch below the edge of the subclavius muscle; cut through the subclavius itself, and proceed then to clear the anterior surface of

218. The SERRATUS MAGNUS. This is a very broad, thin, irregularly square formed muscle, placed altogether behind the axillary vessels and nerves, and is properly a muscle of the shoulder. It arises by eight or nine fleshy slips from the superior ribs; these fasciculi ascend obliquely backwards, and are inserted into the whole inner edge of the base or spinal margin of the scapula. For the take of description and of rightly understanding its use, it may be divided into three portions; a superior, middle and interior. The superior, thick, short and strong, arises from the two uppermost ribs; it lies more forward than the second or middle portion of the muscle, which is thin, aponeurotic, and not unfrequently in great part wanting; the inferior division is the broadest and largest; the central portion of the serratus is connected to the scapula not unfraquently by an aponeurotic arch. In action it moves the scapula forwards; it is likewise a muscle of inspiration when the shoulders are fixed, and the nerve supplying it (the posterior external thoracic branch) has been of late called the external respiratory nerve of the clust. This nerve lies upon the anterior surface of the muscle, crossing its fibres nearly at right angles. A great quantity of loose cellular substance connects this muscle to the adjoining ones, particularly to the subscapular and walls of the chest. If the muscles connected with the arms on the posterior aspect of the body have been dissected, (sec. 185, &c.) and the surgical anatomy of the neck completely finished by the dissector of that region, the arm may now be removed by dividing vertically and in its middle the serratus magnus umsele. Place the arm on a horizontal plain surface, secure it with hooks, and proceed to examine the surgical anatomy of

219. The BEED of the ELEOW and BRACHIAL APO-NEUROSIS. Remove the integuments from off the fore-

part of the extremity as far as the middle of the fore-arm. by an incision carried directly down the centre, and crossed by one made cautiously across the head of the olbow; dissect off the flaps, and examine the superficial veins of the arm. These veins will be found imbedded in the superficial fascia, along with many branches of the rutaneous nerves. The more external vein is the cophalic, which is formed chiefly by the superficial radial voins. The inner one is the busilic vein; thin is formed chiefly by the superficial ulnar veins; it passes through the aponeurosis of the arm to join the fleop veins generally about the middle of the arm, but sometimes higher up; a middle vein is usually found, called the median, from which, about the bend of the elbow, there proceed two branches like the short legs of the letter Y to join the cephalic and basilic; these commueating branches are called median-cephalic and medianbasilie; the former may be opened with most safety in phiebotomy, as the latter runs over the course of the humeral artery. Besides these there is a thick communicating branch connecting these veins with the deep humeral veins. Accompanying and sometimes crossing these veins are branches of the cutaneous nerves. After having dissected and examined these nerves and vessels, let the student next dissect the Brachial Apanewrorie. This is a pretty strong aponeurosis which embraces the muscles of the whole of the upper extremity, with the exception of the fingers, and besides enclosing them generally, furnishes to most of them separate sheaths. In the arm it is called the brachial aponeurosis, in the fore-arm the anti-brachial, in the hand the palmar and dorsal aponeurosis; the retinacula which bind down the tendons, are considered by many anatomists as appendages of this aponeurosis. It varies in thickness and strength, being also composed of fibres running in two apposite directions, and has many openings in it for the passage of vessels and nerves. student should trace it at first from the top of the shoulder to the middle of the fore-arm. On the deltoid it is thin, and looks like cellular substance; on the back of the scapula it is connected to the spine of the scapula, where it is remarkably strong, the posterior part of the deltoid being, as it were, expanded into it.

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It here covers the infra-spinatus and teres minor muscles, and receives slips from the pectoralis major, and latissimus dorsi muscles. It next invests the arm anteriorly and posteriorly, and as it descends sends strong tendinous partitions deep to be attached to the lateral ridges of the homerus which run to the condyles; these are called the internal and external inter-muscular septa. These separate the exterior from the flexor At the bend of the ellow a strong somewhat semilusar slip is sent from the inner edge of the tendon of the biceps to this fascia, or rather to that part of it called the anti-brachial aponeurosis. This strong alip grosses the humeral artery and median nerve, to be afterwards expanded over the surface of the promator teres muscle. It separates the learneral artery from the median basilie win, the win being superficial to it, the artery in general immediately beneath it. It is here where the artery is most usually wounded in phiebotomy, giving rise to a dangerous effusion of arterial blood, a high surgeons have mutaken for an aneurism, founding on these mistaken ideas, false practical views. Although it be usual in anatomical works, to speak of the muscles of the shoulder, arm. fore-arm, and hand, as if they were quite distinct, yet, in point of fact, the arrangement is altogether artificial and vicious; the museles run almost uniformly from one region into another, and same even through three regions. The student being cautioned in this respect. mny proceed with the dissection of the remaining musoles of the upper extremity, in the following order,

220. The Dictroit Muscon is thick, flat, triangular, broader above than below, curved upon itself to ombrace the shoulder joint, whence it descends to the outer side of the arm, as far as its middle. It is composed of seven flashy bundles, separated by grooves more or less deep, and divided into two orders. Those of the first urder, to the number of four, are broad and fleshy above, contracted below, and terminate by strong tendons. One of them, strengthened behind by a transverse fibrous band which unites the anomin-covar-oid ligament to the pectoralis order, arises from the outer third of the amort or edge of the chylicke, by small aponeuroses, and descends obliquely outwards. Another

is inserted externally into the acromion by various aponeurotic fasciculi, which are more or less prolonged in or over the Hesly fibres; it descends vertically. The two last propert from the posterior edge of the spine of the scapula, where they are attached by means of an aponeurosis which unites with those of the trapezius and infra-spinatus, and are directed obliquely downwards and forwards. The bundles of the second order, to the number of three, are placed in the interval of these latter, between which they seem to second, to terminate in a point at the commencing aponeurosis. All these different bundles, which are themselves formed of fleshy fibres disposed in secondary bundles, are united below into a very strong triangular tendon, broad and thick, little apparent externally, but prolonged to a great length upon the inner surface of the muscle, where each bundle farnishes a portion to it; this tendon is attached to the deltoid impression of the humerus, over an extent of about an inch and a half. At its termination, it is embraced by a bifurcation of the braulialis muscle. The outer antiace of the deltoid is convex, and covered by the skin and platysma myoides above. The inversurface is concave and covers in whole or in part, the infraspinatus, terms minor, and tricens extensor muscles, the tendon of the supra-spinatus, aeromio-corneoid ligament, subscapularis, pertoralis minor, biceps, and coraco-brachialis muscles, coracoid process, capsule of the joint, upper third of the outer surface of the humerus, circumflex nerve and vessels, and tendon of the pectoralis mainc. The posterior edge of the muscle is thin above, and thick below. The guterior is separated above from the poeteralis major by a cellular interval occupied by the cephalic vein, and below is parallel to the outer edge of the biceps. The deltoid raises the arm directly, or parries it at the same time forwards or backwards, nocording to the direction of the bundles which set. When the arm is raised, its posterior fibres can lower it. If the arm is fixed, it depresses the shoulder, In removing the deltood, it ought to be cut directly through, about an inch below its origin, and the upper and lower portions mised from the adjacent parts. Divide with a saw the aeromian process, foreibly remove the clavicular portion in commexion with the clavicle and corneo-acromial ligament, and proceed with the dissection of the

221. Supra-Spinatus, long, thick, triangular, pyramidal, broader within than without; and kept in position by a thin aponeurosis, which arising from the whole length of the upper lip of the spine of the scapula, is attached behind the upper edge of that bone, and to the upper part of its inner edge. The fleshy fibres arise from the posterior part of this aponeurosis, and from the two inner thirds of the fassa supra-spinata by short tendinous fibres. They proceed outwards, converge towards each other, and are inserted obliquely round a broad aponeurosis, which, after being concealed among them, contracts, becomes thicker, and entirely emerges from them, passing under the covaco-acromial ligament; it farms a strong tendon, which, curving over the shoulder joint, becomes identified with its capsular ligament, and is also attached to the upper surface of the large tuberosity of the humerus. The posterior surface is covered by the trapezius and deltoides, and by the coraco-aeromial figument. The anterior is applied upon the fossa supra-spinata; (from which it is separated, in its outer third, by cellular tissue, and the supra-scapular vessels and nerve,) and the capsular ligament. It assists the deltoid muscle in raising the arm. If the arm is fixed, it acts upon the scapula.

222. INVEA-SPINATUR, broad internally, parrow externally, thick and triangular. It is covered posteriorly by a thin aponeurosis, but strong. Some of the fleshy fibres come from this appropurosis internally; but the greater number arise from two inner thirds of the fassa infra-spinata. Of these, the upper proceed outwards, and the rest ascend more, and are langer the lower their position is. They go to a broad aponeurosis concealed beneath them, situated nearer the posterior surface of the muscle than the anterior, which, towards the humerns, becomes a strong and thick tendon, which is attached to the middle surface of the large tuberosity of that bone, after being identified with the fibrous capsule of the articulation, and in part incorporated with those of the supra-spinatus and terex minor. The posterior surface is covered externally by

the deltoid musule, internally by the trapezius, below by the latissimus dorsi, in the middle by the integuments. The auterior surface covers the lossa infraspinata, from which it is separated, in its outer third, by much cellular tissue, and by the superior scapular nerves and vessels. It is also applied upon the capsular ligament of the shoulder joint. The muscle, when the arm is lowered, turns it outwards by rotation.

When raised, it draws it backwards.

223. Teres Mixon, an clongated narrow muscle, flattened from above downwards in its inner half, and from behind forwards in the outer. It is situated beneath the preceding, and arises from a rough triangular surface, which limits the foesa infra-spinata near the axillary edge of the scapula, and from two aponeurotic laminæ which separate it from the teres major and infra-spinatus. From thence, it ascends obliquely outwards, in company with the infra-spinatus, to which it is often united. Its fleshy fibres terminate, near the humerus, on the anterior surface of a flat tendon which commences by sponcuroses on the posterior surface of the muscle, and is inserted into the inferior surface of the great tuberosity, where it is united with the espeule of the joint. Some of the lower fibres are directly attached to the humerus, beneath the great tuberosity. Its posterior side is covered by the deltoid muscle and the skin. The anterior covers the dorsal scapular artery, a portion of the long head of the triceps, the fibrous capsule of the joint, and a small part of the senpula.

224. Texas Majon, flat, breader than the preceding, arises by short aponeurotic fibres, from a quadrilateral surface which terminates the fossa infra-spinata inferiorly, and from fibrous partitions that are met with between it and the subscapularis on the one hand, and the infra-spinates and teres minor on the other. From thence its fleshy fibres, which are all parallel, praceed obliquely outwards running along the teres minor; then twisting upon themselves, separate from that muscle, and give rise to a broad and flat tendon, more distinct below than allows, and before than behind. This rendon, which is about an inch broad, follows the direction of the muscle, is applied by its anterior surface

upon that of the latissimus dorsi, unites with it, and is attached to the posterior edge of the binipital groove of the humeros. Its porterior surface is governed internally by the latissimus dorsi, and in the middle by the skin. Externally, it corresponds to the humerus and the long portion of the tricers. The auterior surface is in connexion with the subscapularis, latissimus dorsi, coraco-brachialis and biceps muscles, and with the uxillary vessels and brachial plexus. Its lower edge, which is covered by the integuments, forms with the latissimus doesn the posterior edge of the hollow of the axilla-The upper edge, which is united to the teres mipor internally, but separated from it in the middle by the long portion of the triceps, corresponds externally with the subsengularis muscle, and the circumtlex vessels and This muscle rotates the humorus inwards. When its action is combined with that of the latissimus dorsi and pectoralis major, it applies the arm against the thorax.

225. The Subscapulable is thick, triangular, occupying the whole of the subscapular fossa, from the three inferior fourths of which it prises, both from its periosteum, and from three or four aponeurotic partitions between the fleshy fibres, which are themselves attached to the oblique bony ridges presented by the scapula at this place. The fleshy fibres are disposed into five or six distinct bundles which converge together, and proceeding outwards, are attached to the two surfaces of a broad and flat tendon, which, contracting and becoming thicker, terminates at the small tuberesity of the humerus by embracing it, and extends a short way on the shaft of the hone. It adheres strongly to the capsule of the joint. The autorior surface is separated from the serratus magnus, with which it forms the hollow of the axilla, by a very thick layer of cellular tissue. Its outer part corresponds to the brachial plexus, axillary artery, and comeo-brachialis, biceps, and deltoid museles. When the arm is abducted from the body, the subscapularis sleaves it toward it, or abducts it; it can also turn the arm inwards, and when raised, depresses it. It also strengthens the shoulder joint. A law and narrow block placed under the axilla will enable the student to dissect most of the muscles in the region of the shoulder. The arm should now be placed on the anterior (flexor aspect), and the muscles of the arm disacted.

226. The TRICKER EXTENSION is divided superiorly into three portions or heads, viz. a scapular or long head, and two shorter or humeral heads; the scapular is also called the middle head; the second as to length is external and posterior; the third as to length is internal and somewhat auterior. The scapular head arises from the highest part of the axillary margin of the scapula, by a flat tendon, which separates into two aponeuroses, an outer, short; and on inner, which extends much farther downwards. The fleshy fibres of this portion of the muscle, arming from the outer and back part of the tendon just mentioned, form a bundle. which descends vertically between the teres major and teres minor, belied the shoulder joint, then increasesin size, and is united to the outer portion about the upper third of the arm, and to the inner about its middle. The outer portion (caput externant) arises, by a pointed extremity, from the upper part of the outer edge of the humerus, beneath the great tuberosity of that hone. and almost immediately below the insertion of the teres minor muscle. Its fieshy fibres shorten as they descend, and come from the outer edge of the humerus over a larger extent, and from the external inter-muscudar partition or ligoment, common to them with those of the deltoid muscle and brachialis. The inner portion (esput breve) commences under the tendon of the teres major and latissimus dorsi by a pointed extremity, which is attached to the oner edge of the humerus, and receives additions in succession from an aponeurosis which covers it above, from the posterior surface of the humerus, the internal inter-muscular ligament. After their union, these three portions form a thick and broad bundle, and terminate by a strong, broad, and thick tendon, which is attached to the posterior and upper part of the electanon process of the ulna. Besides the fleshy fibres furnished to the tendon by each of the three partians, the common burstle recrives a number of others, which arise along the lowerthird of the posterior surface of the humerus, to near the

obsermal eavity, and descend obliquely backwards upon The outer side of the anterior surface of the tendon. the tendon and of its aponeurotic origins serves for the insertion of several others, which come from about the lower fourth of the outer edge of the humerus, where they leave between them a small specture for the passage of the muscale-spiral nerve, and its accompanying vessels. The parterior surface of the muscle is covered above by the teres minor and deltoid, and in the rest of its extent, by the brachial aponeurosis and the skin-The anterior surface superiorly covers in part the subscapularis, teres major, and latissimus dorsa, and fibrous capsule of the shoulder joint; inferiorly, the posterior surface of the elbow joint. In action the muscle extends the fore-arm upon the arm, and in certain circumstances the arm apon the fore-arm. When the formarm is extended, its long portion carries the arm backwards. It may also sometimes move the scanula upon the humerus. Place the arm on its posterior (extensor) aspect, and dissect the flexor muscles.

227. The Conaco-Brachtalia is long, thin, flat, and narrow, especially at its extremities, and is situated at the upper and inner part of the arm. It arises from the summit of the coracoid process, between the short head of the biceps and the pectoralis minor, with which it is united; this origin takes place by means of an aponeurosis, which also belongs to the short portion of the biceps, is extended before their common fibres, then interposed between the two muscles, and separates into two portions, one for each of them. It is from the posterior surface of this aponeurosis that the fleshy filtres arise. In their upper third they are incorporated with those of the biceps, afterwards separate, and form a bundle which increases in size to its middle part. Near the humerus, they terminate in an aponeurosis, which is fixed to the middle part of the inner surface and edge of the humerus, between the brackialis and tricepa. The muscle is generally traversed at its middle part by the external cutaneous nerve. Its unterior surface is envired by the deltoid, poetoralis major, and bicept. The proterior is applied upon the subsempularis muscle, the united tendons of the latissimus dorsi and teres major, the axillary artery, the external cutaneous and median nerves, and the brachial artery. In action, it ruises the arm and carries it forwards and inwards.

228. The Breeze Flexon Curry is situated on the fore and inner part of the arm, long, broad, and thick at its middle part, and divided above into two portions. The outer is long, arises from the upper part of the edge of the glenoid cavity of the scapula, by a long, flattened tendon, continuous with the glenoid ligament. This tendon turns over the head of the humerus, crosses the articulation obliquely inwards, and advances to the interval between the two tuberosities of the humerus, surrounded by a sheath which is furnished by the synovial capsule. It then becomes rounded, contracts, and enters the bicipital groove, still accompanied by the synovial membrane, and kept down by a prolongation of the fibrous capsule; emerging from this groove, it continues to descend vertically, expands, and gives rise to fleshy fibres. The igner portion is short, attached to the summit of the coracnid process, descends, approaching the other, and becomes fleshy sooner than it. These two fleshy bundles approach each other as they descend, and are at length intimately incorporated toward the lower third of the arm. The bundle which results from this junction continues to descend, contracting, and near the elbow-joint forms a tendon, appearing sooner on the outside than internally; at first broad and thin, it is in a great measure concealed by the fleshy fibres. When fairly emerged from them, it becomes narrower and rounded, turns obliquely outwards, and then sinks between the supinator longus and pronator teres, and on arriving beneath the elbow, twists upon itself to terminate by embracing the bicipital tuberosity of the radius, at its back part. The outerpy surface of the bicops is covered superiorly by the deltoid and pectoralis major: in the rest of its extent, by the brachial apone prosisand the integuments. The posterior surface rests upon the humerus, the cornco-brachialis and brachialis muscles, and the external cutaneous nerve. Its inner edge is united above with the coraco-brachialis; in the middle and below, it is accompanied by the brachial

artery, median nerve, and veon comites, or deep bumeral veins. A thin bose bursa invests the fore pair
of the hicipital process and neck of the radius, and no
doubt contributes to facilitate the motions of the forearm. In action the biceps bounds the fore-arm on the
arm, supinates the hand when it is prone, or bends the
arm upon the fore-arm when the latter is fixed. It
may bring the humerus and scapala closer together,
and strengthens the shoulder joint by means of the

tendon of its long portion.

229. The BRACHTARIS PLEXOR is deeply seated at the lower and fore part of the arm, before the elhow-joint, flat, broader in the middle and at its upper part than below. It arises from the anterior aspect of the humerus, over a space extending from the deltoid impression to near the allow-joint, and also along the inner edge of that bone, and from the apapeurotic inter-muscular partitions. From these origins it descends increasing to its middle part, then becomes a little thinner, passes obliquely inwards over the elbow-joint, and terminates at the rough impression beneath the coracold process of the ulna, by a broad and thick tendon, which commences by several portions at a considerable distance above the joint, in the substance of the muscle, especially on the outer side. Its anterior surface is covered above by the brachial aponeurnsis and the skin; below and externally, by the aupinator longus, which is bulged in a depression which it presents; at the moddle by the biceps musule and the external cutaneous nerve; internally, by the brachial artery, the median nerve and the pronator teres. The pasterow surface covers the lower part of the humerus and elbow-joint. Its upper extremity presents a notch which embraces the tendon of the deltoid muscle. It bends the fore-arm open the arm, or the latter upon the former. The axillary artery, having given off the branches already enumerated (p. 200). passes in front of the tenden of the latissimus dersi musele, here changes its name for humeral or brackist. and proceeding downwards as far as the bend of the elbow, there divides into two branches, the conlint and olver. In its pourse, the homeral arrery is exclused in a sheath of loose cellular substance, along with the

median nerve and the deep hangeral print (year conti-(ex), which frequently anastomose with each other. both in front and behind the artery. In the upper part of the arm the great artery is placed upon the inner margin of the coraco-brachialis, and inferiorly upon that of the biceps; it passes below that portion of the fascia which is sent from the tenden of the biexps across the pronator teres muscle, and rapidly sinking deeper at this spot, soon after divides into its radial and ulmar branches. The vessel in its course through the arm is naturally subjacent to the aponeurosis; the ulnar nerve runs somewhat parallel to it. but not quite so, and gradually recedes from it, passing more inwards towards the internal condyle of the humerus, whilst the humeral artery preserves more the direction or axis of the centre of the arm. Moreover the vessel is placed superiorly upon a small part of the triceps, but inferiorly chiefly upon the brachinlis flexor. The branches which it sends off in this course are few comparatively : 1st, Those proceeding from the external side of the artery have no particular names; they are merely muscular branches supplying the mijacent muscles. 2d, Those from the internal side of the artery are, the profunda humeri superior, profundainferior, and arteria anastomotica magna. Finally, there is a small artery proceeding also from the humeral, somewhat below the middle of the arm, and which, after perforating the tendon of the coraco-brachialis. enters the osseous canal leading to the modullary cavity of the humerus; this artery is the arteria natritia humeri. The nerves found in the arm are some of those already mentioned as coming from the brackial plexus. Lst, The mesculo-spinal, or radial nerve, passing between the humeral heads of the tricens, and winding round the humerus in a groove which the bone presents, will be found by the student between the upper part of the supinstor longus and brachialis flexor; from this it may be traced on the radial side of the fore-arm to the fingers. 2d, The median, which has been already mentioned, and traced so far as the bend of the elbow, into which it passes a little to the inner side of the humeral artery. 3d, The alner, deseending on the triceps and brachistis as far as the

inner condyle, behind which it passes to the fore-arm; a small artery generally accompanies it. 4th, The circumfler, or axillary, which more properly belongs to the description of the axilla and shoulder. between the long head of the triceps and the surgical neck of the humeris, accompanied by the internal circumilex artery and voin. 5th. The external cutaneous, or performs casserii, which will be found passing through the coraco-brachialis muscle, or closely connected with it. 6th, The internal cutaneous, already spoken of in describing the axilla and superficial reins of the arm. There is a second or smaller internal entaneous, and two intercosto-humeral nerves, some of whose branches are met with in this dissection, but their minute history belongs rather to that of the The dissection of the extensor nervious system. muscles should precede those of the flexors, and the anadent will therefore carefully stitch up the integuments, or take other means to preserve the parts exposed on the anterior aspect of the arm, so that the extremity may be placed on that aspect. Make an incision through the integuments from the elbow to the root of the fingers, reflect the skin to the right and left, and with it the subcutaneous cellular tissue, in which will be found imbedded some superficial veins and nerves; next dissect the anti-brachial aponeurosis, of which we have already said a good deal. On the posterior aspect of the forearm it is strong, and extends as far as the roots of the fingers; the fibres run in several directions, but chiefly in two. Connected superiorly to the condyles of the humerus, and receiving a strong tendinous expansion from the triceps, it despends, investing the muscles generally and particularly, sending partitions between most of them, which proescaling deep, are attached to the bones of the forearm. The posterior annular ligament of the carpus (retinaculaw tendinum musculorum) binding down the extensor tendons, is connected to the styloid process of the ulna. and passing across from one hone to the other, is equally attached to the styloid process of the radius. The aponeurosis of the forearm sooms to pass over this annular ligament and to form a very thin covering on the back of the hand, but as it proceeds over the ligatnent, it is intimately connected with it. The retingexists which looks like a single, strong hand of ligamentous fibres, externally presents a quite different appearance on the side which touches the temtons; it sends partitions inwards, so as to enclose in segments shoulds the following tendons. In The tendon of the extensor carpi ulnaris. 20, The tendon of the extensor mimimi digiti. 3°, The tendens of the extensor communis digitorum and extensor indicis. 4". The tendon of the extensor secundi internodii pollicis. 5°, Those of the extensores carpi radiales. 6°, The tendons of the extensor easis metacarpi polices and primi internodii pollieis; even these two are partially separated from each other by a partition. All these sheaths formed by the annular ligament have burse within them to favour the action of the muscles and undons to prevent friction, but they will be better examined at a later period of the dissection. The bodies of the muscles themselves are also enclosed in separate sheaths, as the student will observe in the process of cleaning them. Having carefully surveyed this aspect of the anti-brackial aponeuroais, proceed to raise it from the muscles.

230. Asconeus, short, thick, triangular, and placed behind the elbow joint. Arises tendinous from the outer condyle of the humerus, and descending becomes fleshy, the fibres following different directions. The upper are short, continuous with those of the triceps, nearly transverse, and terminate by short aponeurous at the outside of the electranon. The lower, longer and more oblique the lower their position is, are inserted, also by short aponeurouses, into the upper fourth of the posterior edge of the ulus, forming a sharp point below. The ancocous is applied upon the articulation of the forcarm, annular ligament of the tracius, supinator bevis and the aloa. It assists the triceps extensor muscle, and may be considered a continuation of its.

231. Extension Caret Univers is long, fusiform, arises from the outer condyle of the humerus, by a common tendon, from the aponeurotic septum placed externally between it and the extensor minimi digit, from the aponeurosis of the fare-arm, and from about the middle third of the posterior edge of the ulna, below the anconeus muscle. From thence it descends at first ob-

liquely inwards, and then vertically behind the ulna, and becoming tendinous sooner apparent behind than before, gets engaged in a particular grouve, under the posterior annular ligament near the lower extremity of the ulus. It passes behind the cunciform bone, in a sort of fibrous canal, attached to that bone, the pisiform bone, the os anciforme, and the styleid process of the ulna. It passes under the abductor minimi digiti, cularges a little, and terminates at the inner and back part of the upper extremity of the lifth metacarpal bone, whence it sends some aponeurotic fibres over the opponens minimi digiti. The posterior surface of this muscle is covered by the aponeurosis of the fore-arm, to which it adheres abuve. The unterior is applied upon the supinator brevis, extensor ossis metacarpi, and extensor secondi internodii pollicis, and extensor proprius indicis muscles, and upon the ulun. Its owier edge is united above to the extensor proprins minimi digiti; the issuer is contiguous at its upper part to the anconeus. It extends the hand upon the fore-arm, inclining it a little upon the ulna.

232. Extensor Maximi Didera, situated to the outside of the extensor communis, long, but slender. It arises from the nuter condyle, by a common tendon, the aponeurotic septum which separates it from the proceeding muscle, that which is placed, internally, between it and the extensor carpi ulnaris, and from the anoneurosis of the fore-arm. Its desby fibres form a amail hundle, which descends and passes very obliquely to within a short distance of the carpus, on the anterior surface of a tendon at first concealed in their substance. and entirely free near the posterior annular ligament. which presents a fibrous esnal for it, opposite the lower radio-cubital articulation; this canal is directed obliquely downwards and inwards, lined by a synovial carsule, and about two inches in length. Before passing into this canal, the tendon of the musele divides into two portions, which remain contiguous and connected by cellular tissue; but towards the upper part of the metacarpus, again becomes single and unlarges. It then arrives at the little finger, to the phalanges of which it is attached. This muscle covers the supinator brevis, extensores pollicis, and extensor indicis. Its

outer edge is united above to the extensor digitorum communis; the fever to the extensor carpi ulmaris. It

extends the little finger.

233. Extension Comments Deceronose, long, round, fleshy and simple at its upper part, terminating below in four tendous, arises, superiorly, from the outer condyle, by a tendon, common to it and the other three preceding muscles, internally, from a long aponeurotic partition, sent off from that tendon, which separates it from the extensor propries minimi digitic externally, from a shorter partition placed between it and the extensor carpi radialis brevior; posteriorly, from the aponeuronia of the fore-arm. From these different origins. its fleshy fibres proceeding obliquely, form a bundle, which divides into four portions, at first united by cellular tissue, and terminated each by a tendon at first concealed by their substance, and accompanied by the fleshy fibres to near the wrist, particularly in those of the ring and little fingers. These tendons vary in size: that of the ring finger is the strongest and thickest; the next is that of the middle finger, and the little finger has the smallest. They pass along with the tendon of the extensor indicis in a groove, formed behind the carpal extremity of the radius, where they are kept down by the posterior annular figument. Beneath this ligament, the tendons diverge, become broader, and procend to the base of the memcarpal hones. The last three are commonly split longitudinally, and send small aponeurotic bands, varying in size, and more or less oblique, to each other. Opposite the articulations of the metacarpal bones with the phalanges, they contract and became thicker. They then become broad again, and receive the tendons of the lumbricales and interessei, forming with them an aponeurosis which covers the whole posterior surface of the fingers. Towards their extremity, they divide into three portions, the middle of which passes behind the articulation of the proximal and middle phalanges, to be inserted into the posterior surface of the latter, while the two lateral pass over the sides of the same articulation, contracting and separating from each other; they then approach and resunite, forming a flat tendon which is attached to the posterior and upper part of the distal phalans. The muscle is

covered posteriorly by the aponeurosis of the fore-arm, with which it is intimately united, asteriorly it covers the supinator brevis, extensores politicis, extensor indicis, the wrist joint, the posterior surface of the carpus, metacarpus and fingers, and the interessei dersales muscles. Between its ower edge and the extensor carpi radialis brevior, is an interval in which the extensor ossis metaearpi and extensor primi internodii pollicis are som-The tendons as they pass under the annular ligament, are embraced by a synovial membrane. This muscle extends the phalanges of the last four fingers upon each other, and upon the metacarpal bones, the hand upon the fore-arm, or the fore-arm upon the hand. Divide the extensor communis and extensor minimi digiti about the middle of the fore-arm, reflect the inferior tendinous portions towards their attachment, and proceed to ex-

amine the deep layer of muscles.

234. Extensor Indicas Properus (Indicator) arises by short aponeuroses, from the posterior surface of the alaa, and from the interesseous ligament, forming a tendon inclosed in its substance, which becomes free towards the posterior annular ligament of the wrist, unites with those of the extensor communis digitorum, by means of a membraniform cellular tissue, passes into the same groove with it, is embraced by the same bursa, and, on arriving at the back of the hand, is situated to the outside of that which the extensor communis sends to the fore-finger. It is incorporated with it behind the articulation of the second metacarpal bone with the first phalanx of the fore-finger, to terminate in the manner indicated. (233) This muscle lies on the ulan, the interosseous ligament, the extensor secandi internodii policis, the inferior extremity of the radius, and the back of the hand. It arises in common with the extensor secundi internodii pollicis. In action it extends the three phalanges of the fore-finger.

235. Expressor Second Isternoon Polliciaries from about the middle third of the posterior surface of the ulus, and from a small portion of the interosecous ligament. It descends outwards, and terminates in a tenden which first appears behind, and is isolated near the lawer extremity of the radius, where it passes under the posterior annular ligament, in a special occoun-

groove, out much deeper than the general groove for the tendans of the extensor communis, and to a certain extent, distinct from it; its outer rulge presents a short elevated ridge calculated to retain the tendon in its situation, and to act as a staple. When the tendon has arrived at the back of the hand, it passes over the tendons of the radial extensors, crosses their direction, descends at the posterior and inner part of the first metacarpal bone, joins the tendon of the extensor primi intermedii pollicis near the articulation of that bone with the first phalanx, receives in the same place two aponeurotic expansions from the abdactor and flexor brevis pollies, and is inserted at the back part of the phalanx of the thumb. The muscle lies upon the extensor ossis, metacarpi pollicis and extensor primi internodii pollicis, the two bones of the fore-arm, the interesseous ligament, the wrist joint, the tendons of the radial extensors, the first metacarpal bone, and the phalanges of the thumb. In action it extends the last phalanx of the thumb upon the first,

236. Extension Primi Internophi Politicis arises from a small portion of the ulps, from the interesseous ligament, and more especially from the posterior surface of the radius. It becomes on the outer side of the forearm, a slender tendon, more apparent externally than internally, which passes into a groove on the outer side of the distal extremity of the radius and in which the tendon of the extensor ossis metacarpi is also lodged. On issuing from this groove, it separates from the extensor ossis metacarpi pollicis, descentis behind the first metacarpal bone, and is inserted at the upper and back part of the first phalanx of the thumb. In its course. this muscle adheres so closely to the extensor assis metaearpi pollicis, that the student is upt to overlook it. The muscle covers a small portion of the ulua, the interosseous ligament, and the posterior outer surface of the radius, the first metacarpal bone and its articulation with the thumb. In action it extends the first phalanx of the thumb, and also assists in supination.

237. Extension Ossia Meracanti Politicis, long, and flat, broader in the middle than at its extremities. It arises by a pointed extremity from the posterior surface of the ulms, beneath and in common with the supinator brevis; then by short aponeurotic fibrus, from a ridge on its posterior surface, and also from a line directed obliquely downwards and outwards, and from the interesseous ligament. Its fieshy fibres form a fusform bundle which descends abliquely outwards behind the fore-arm, and terminate upon the posterior surface of a tendon, at first concealed among them, which they accompany to the inferior extremity of the radius; there, the tendon passes into a groove, on the outerside of the radius, which is common to it and the extensor primi internalii pellicis. On issuing from this groove, the tendon divides into two or three portions, and goes to be inserted into the outer part of the superior extramity of the first metacarpal bone, also into the trapezium, occasionally sending a small prolongation to the abductor pollicis. This muscle at its lowest part, is in connexion with the aponeurosis of the fore-arm. It covers a small portion of the ulna above; the interesseons ligument and the posterior and puter surface of the radius, the tendons of the radial extensors, the radial arriery, and the wrist joint below. In action it earries the thumb outwards and backwards, and contributes to supination. Place the arm on its internal or ulnar margin, secure it by means of hooks, and examine the muscles on the radial margin.

238. Supinator Longus, clongated, fusiform, flattened from before backwards in its upper fourth, and transversely in the rest of its extent, arises, by abort tendinous fibres, and over an extent of about two inches, from the external ridge of the laumerus, between the brachialis and triceps, and from its external inter-muscular septum, terminating by a that tendon, which, at first lying upon its anterior surface, becomes free about the middle of the fore-arm. This tendon is thin and broad above, becomes thick and norrow as it descends, runs along the outer edge of the radius, and is inserted near the base of its styloid process, sending off a fibrous clongation, which lines the groupe in which the extensor ones metacarps and extensor primi intermulii pullieis glide. The anterior side of this muscle is covered by the skin, and aponeuroals of the fore-arm. The pesterior covers the supinator brevis, estimor carpi radialis longior, promitor teres, flexor carpi radialis, tlexor sublimia digitorum,

the aur longon pollicis, and the radial artery and nerve. The isser side is applied above, upon the brachalis flexor, and the radial nerve. Upon the ulnar side of its tenden may be found the radial artery in the lower third of the arm. In action this muscle supinates the hand, and assists in bending the fore-arm upon the arm. Heffect the supinator longus, by dividing it in the middle of its fleshy belly, and thereby expose the long radial extensor muscle.

209. EXTENSOR CARPI RADIALIS LONGIDE, DEATH of the same form as the supinator longus, beneath which it is situated, arises farther down, from the same ridge of the humerus, and from its inter-muscular septum; it also receives some fibres from the upper part of the outer condyle. It forms a hundle at first flat, then larger and rounded, descends vertically on the outside of the fore-arm, and terminates in a tendon at first thin and broad, becoming narrow and thick, which turning backwards, passes beneath the extensor ossis metacarpi, and extensor primi internodii pollicis, and covers the tendon of the extensor carpi radialis brevior, both entering a particular groove, formed behind the lower extremity of the radius, where they are fixed by the nosterior annular ligament of the carpus. On emerging from this groove the two tendons separate. That of the extensor carpi radialis longior passes over the wrist joint, and is inserted at the posterior and outer part of the upper extremity of the second metacarpal bone. The auterior surface of this muscle is covered by the appareurosis of the fore-arm, the supinator longus, extensor ousis metaearpi, and extensor primi internodii pollicis. The posterior covers the elbow-joint, the supinator brevis, and extensor carpi radialis brevior muscles. In action it extends the band upon the fure-arm. Divide this muscle, and expose the

240. Expression Carry Radiants Breyton, precisely similar to the preceding, behind which it is placed. It arises from the outer condyle by means of a common tendon, which sends an aponeurotic protongation over its inner surface, and an aponeurotic partition between it and the extensor communic digitarum. It descends in the same direction as the extensor carpi radialis longior, forms a tendon of the same length and form, which passes into the same groove, and is attached to the poterior and outer part of the upper extremity of the third metacarpal bone. In action it extends the load upon the fore-arm. The student must have observed, that although these muscles are called carpal, they really send their tendons to the metacarpal bones, but at the same time they act principally on the wristjoint and carpal articulation. Divide this muscle, and

expose the

241. Superkaron Burves, broad, thin, and triangular, embracing the head of the radius; arising from the outer condyle of the humerus by a broad thick tendon, from the external lateral ligament of the elbow-joint, from the aunular ligament of the radius, and by distinct aponeurotic fibres, from a longitudinal ridge observed upon the posterior surface of the ulna. Its commencing tendon expands over the outer surface of the fleshy fibres, which are short and nearly vertical before, long and more oblique the more posterior they are, and all twisted round the radius, to the fore, outer, and back part of which they are attached by distinct aponeurous, deeply concealed in their substance. It covers the outer part of the elbow-joint, and superior radio-cubital articulation. Its posterior edge covers the upper part of the extensor ossis metacarpi, and extensor secandi internodii pollicis. The univrior is notched above for the passage of the tendon of the biceps flexor, and is covered below by the pronator teres. These two edges unite, forming an acute angle, which is attached to the outer side of the radius, above the insertion of the latter muscle. In action it turns the radius upon its axis from before outwards, and brings the hand into supination.

242. The dissection of the flexor muscles of the band, together with the vessels and nerves, falls next to be examined. They cannot be considered in an insulated way, as has been almost uniformly the practice heretofore, for must of the structures in the anterior part of the fore-arm terminate in the hand. Reflect the integuments from off the entire surface, as far as the extremities of the fingers, and thus expose the superficial fascia, imbedded in which will be found many superficial veins, the origins of those already alluded to, and the branches of the external and internal cuta-

neous nerves. After removing these the aponeurosis of the fore-arm and of the haml will be exposed. On the fore-arm the aponeurasis is strong, and the fibros. run in various directions. As it passes over the wristjoint, it is intimately united to the auterior annular ligament, (Retinaculary Tendinum Musculorum,) but does not form it. It then proceeds into the hand where it forms the palmar aponeurosis. Of this palmar aponeurosis very minute descriptions have been given by aurgical anatomists. It may be divided into three portions, a middle, external, and internal. Of these, the middle is by much the strongest, and composed of very strong glistening fibres, continuous with the anoneurosis of the fore-arm, and with the expanded fibres of the palmaris longua when present. This portion is of a triangular shape, and occupies the hollow of the hand; narrow at its commencement, it gradually spreads out, and a short way from the roots of the frugers, divides into four fasciculi, each of which again bifurcates to be finally attached to the sheaths of the tendons of the flexor muscles. These fasciculi are crossed by strong aponeurotic fibres posteriorly, and, moreover, they are attached to the metacarpal bones and inter-asseal musclass. Their importance has only been rightly appreciated since the discovery of M. Dupytren, that their contraction occasionally gives rise to permanent flexion of the fingers. This splitting of the central portion of the nalmar aponeurosis into fasciculi, is supposed to be necessary to allow of the tendons of the flexor muscles, the digital arteries and nerves to proceed to the fingers. The external portion of the palmar aponeurosis is thin, and covers the muscles of the ball of the thumb; the internal portion is also thin, it covers the muscles connected with the little finger.

243. PARMANTS BREVIS arises from the iner edge of the middle portion of the palmar appnearosis, and from the annular ligament beneath it, and terminates in the integuments and subjacent cellular substance. It is usually composed of three or more small fleshy bandles, but sometimes fewer than these. They cross the abductor and flexor muscles of the first force. There is no analogous muscle in the first. The slear artery and nerve he beneath it.

244. RETINACULUM TENDINUM MUSCULOBUM, (Ligamentem Annulure Anterior,) is usually considered as a continuation of the aponeurosis of the fore-arm, but it is evidently not so. This is a strong and broad fibrous band, of a quadrilateral form, broader transversely than from above downwards, extended at the fore part of the carpus, and converting into a canal the groove which that part presents. It is attached externally to the fore part of the trapezius and scaphoides, and farnishes insertious to the abductor, opponens, and flexor brevis of the thumb. Internally, it is attached to the pisiform bone, the process of the os unciforme, and a ligament which descends from the one to the other. It affords some points of origin to the opponens minimi digiti, and receives a prolongation of the tenden of the flexor carpi ulnaris. Its upper edge and anterior surface are connected with the uponeurosis of the forearm; the lower with the pulmar aponeorosis. Its anterior surface is also covered by the tendon of the palmaris longus, which is intimately united to it; by the palmaris brevis muscle, the skin, and the ulnur nerveand vessels. The posterior surface contributes to the formation of a canal, in which the tendons of the two common flexors, and of the flexor longus pollitis, and the median nerve pass. The fibres of this tendinous band are numerous, transverse, and close upon each other. Beneath this ligament is a most extensive and highly complicated bursa, in which there form not unfrequently those small rounded foreign bodies which Lænnen and others have railed acephalocysts. Proceed next with the muscles.

245. Proxator Tunes, extended obliquely at the opper and anterior part of the fore-arm. Short, broad at its commencement, arising from the inner condyle of the humorus by a tendon common to it with the flexor carpi tadialis, palmaris longues, flexor carpi ulnaris and flexor digitorum sublimis; from the coronoid process by another small distinct tendon, the median nerve passes between it and the first; from an aponeurotic septum which separates it internally from the flexor carpi radialis; from a similar partition placed between it and the flexor sublimis, and lastly, from the aponeurosis of the fore-arm. Its flexity fibres, which are all

parallel, descend obliquely outwards, to the middle of the outer surface of the radius, where they are attached by a broad and thick tenden, at first concealed in their substance, and afterwards expanded in the form of a membrane over their anterior surface. Covered anteriorly in its two upper thirds, by the aponeurosis of the fore-arm and by the skin; in the lower third, by the supinator longue, the radial nerve and vessels, and the radial extensor muscles. Posteriorly it covers the brachialis flexor and flexor sublimis muscles, the median nerve and ulner artery. Its enter edge is separated above from the supirator longus, by a triangular space in which are lodged the tenden of the bicops, the brachial artery and the median nerve, thus forming the inner boundary of the hollow at the head of the cibow; inferiarly, it is parallel to the anterior edge of the appinator brevis, which it covers a little. In action it turns the radius upon the also from without inwards, and

thus turns the hand prone.

246. FRENOR CARPI RABIALIS is long, fusiform thick and fleshy above, thin and tendinous below, situated internally of the promator teres. It arises alsove from the inner condyle of the humerus by a common tendon; anteriorly, from the aponeurosis of the forearm; posteriorly, from an aponeurotic septem separating it from the flexor sublimis, and which afterwards deseemds some way upon its posterior surface; externally and internally, from two similar partitions which separate it, in these two directions, from the pronator teres and palmaris longus. Its fibres form a bundle, large in the middle and slender at its extremities; they descend outwards, and near the upper third of the foresarm. form a tendon, which descends in the original direction of the muscle, passes over the wrist, enters, behind the abductor and opponens pollicis, a groove of the trapezium, in which it is retzined by a ligamentous sheath and by a small prolongation of its own fibres, and is attached to the fore part of the upper extremity of the second metacarpal bone. The tendon cannot be fully traced to its termination until the muscles of the hand have been dissected. The anterior perface of the flexor carpi radialis is covered externally by the supinator longus, and in the rest of its extent, by the aponeurosis of the forearm. The posterior is applied upon the flexor digitarum perforatus, flexor longus politicis muscles, and the wrist-joint. Its two edges are connected above with the pronator teres and palmaris longus. In the lower third of the arm the radial artery will be found between the tandon of this muscle and that of the supinator longus. In action it bends the hand upon the fore-arm,

turning it a little inwards.

247. Parmants Longus. Placed internally to the preceding, arises above from the inner condyle by the common tendon; behind, externally and internally, from aponeurotic partitions which that tendon sends between it and the flexor perforatus and flexor carpitalisalis; anteriorly, from the aponeurosis of the fore-arm. The fleshy fibres descend vertically, and terminate by a thin, that, slender tendon, which loses itself in the upper part of the palmar aponeurosis, after sending some fibres to the anterior annular ligament of the wrist. Its two edges are united above, the one with the flexor carpi radialis, the other with the flexor perforatus, which muscle it also covers. In action it stretches the palmar aponeurosis, and bends the hand on the fore-arm.

248. FLEXOR CARPI ULNARIS. Situated internally of the preceding muscles, at the forepart of the inner edge of the fore-arm, long, thin, flat, semi-penniform, broader above than below, arises from the inner condyle of the humeros, by the common tendan, and from the inner side of the obseranon; between these two origins the ulnar nerve passes, covered by an aponeurosis which goes from the one to the other. It also takes origin, externally, from a short aponeurotic septum which separates it from the flexor perforates; internally, from the aponeurosis of the fore-arm, which presents for this attachment very distinct and strong fibres, proceeding to the posterior edge of the alna, and there fix the muscle over a great extent. From these different points the fleshy fibres descend, the outer nearly vertically, the inner obliquely forwards and outwards. The first terminate at the upper extremity, the others along the whole posterior surface of a long tendon, which, however, poly lincumes from from monoular filters at the lowest part of the fore-arm, and is inserted into the pisiliurm bone. At its termination, some fibres are

detached from it, of which one set descends before the abductor and flexor minimi digiti, while the others pass over the abare artery and nerve, to be continued into the upper part of the anterior annular ligament of the wrist. This muscle covers the flexor perforans, the almar artery and nerve, and the pronator quadratus. Its outer edge is united above with the flexor perforants, from which it is separated below by an interval, where the ulnur nerve and vessels are seen, and thus the tendon forms a guide to ascermin the position of the artery. In action it bends the band upon the fore-arm, inclining it a little toward the ulna. Divide the three last described muscles, reflect their tendons towards their insertion, and proceed with the dissection of the

249. FLEXOR DIGITORUM SUBLIMIS OF PERFORA-Tus, clongated, thick and flattened. Simple above, separating into four tendons below, arising from the inner condyle, by the common tendon; from the internal lateral ligament of the elbow-joint, from the coronoid process of the ulma; from two aponeurotic partitions which exist between it and the flexor carpi ulnaris internally, and the pronator teres, palmaris longus, and flexor carpi radialis, anteriorly. From these different points there proceeds a rather thin firshy bundle, which descends a little ubliquely ontwards, and receives another bread, thin, and flat muscular plane, which comes from the anterior edge of the radius, where it is attached by distinct apaneurotic fibres, between the supinanator brevis and flexor longus pollicia. The musclethen increases in breadth and thickness, and is frequently farther augmented by another portion, arising separabely from the inner condyle; it descends vertically, and soon divides into four portious, which proceed one to each of the last four fingers. Two are anterior, united to each other by their edges, and belong to the middle and ring fingers; two posterior, one for the fore finger, the other for the little finger; the latter is the smallest, while that of the middle finger is the broadest and thickest. They are all terminated by tendons proportioned to their size, which are connected together, and with those of the flexor perforant, by loose cellular tissue, These four tendons pass into the concavity presented by the anterior aspect of the carpus, and are there kept

down by the annular ligament, beneath which they arparate from each other to descend into the palm, behind the palmar aponeurosis, and before the tendons of the flexor perforans and the lumbricales. They then enlarge a little, are enveloped by a loose cellular sheath, and engaged toward the heads of the metnearpal hones, between partitions formed by the palmar aponeurosis, and are lodged in a groove which the anterior surface of the phalanges presents, where they are retained by a peculiar fibrous sheath, (only one of which should be opened at this stage of the dissection.) Before arriving at these sheaths, (250) the tendons exhibit the appearance of a middle longitudinal division, and present posteriorly a sort of concave channel, which receive the correspending tendons of the flexor profundes; but, towards the lower part of the first phalanges, they split in the middle to afford a passage to these latter, and divide into two portions, which separate at first, then turn and approach each other, so as to form anteriorly a second cleannel, which is filled by the tendon of one of the portions of the flexor profunder. These two portions unite towards the articulation of the proximal and middle phalanges, and send off to each other small fibrous bands which decussate. Lastly, they separate again, contract and terminate on the sides of the anterior surface of the middle phalans, near its centre, their first separation, these portions are attached to the anterior surface of the proximal phalanges by one or two long and slender ligamentous bridles. This musels covers the flexor profundus, flexor longus pollicis, the median nerve, the ulnur artery, the lumbricales muscles, and the phalanges of the tingers. In action, it bends the middle phalanges upon the proximal, and the latter upon the metacarpal bones, and lastly the hand upon the fore-arm.

250. The Firstone Sheaves of the Pingers form with the anterior surface of the phalanges, a true canal, half bony and half fibrone, which lodges portions of each of the tendone of the two flexor muscles. They commence beneath the inferior metacarpal ligament, from which several fibres are sent off to join them, and terminate at the distal phalanx by interlacing with the expansion of the tendon of the flexor profunder, being

in their whole extent attached along the edges of the phalanges. The anterior surface is covered by the skin, and collateral vessels of the fingers; the posterior is smooth, and lined by a synovial bursa. The tissue of these sheaths is compact; they are formed of interlaced transverse fibres, of a pearly colour, and very thick at the middle of the proximal and middle phalanges, but opposite their articulation, disappear entirely, so as to leave the synovial bursa exposed. The latter proceeds from the wall of the sheaths over the tendons, forming above and below very distinct culs-desuc, and having enveloped these tendons, is reflected posteriorly to the anterior surface of the phalanges by a triangular fold, formed of two laminæ placed back to lack. The separation which exists between the two terminal slips of the tendons of the flexor perforatus, is filled by prolongations of the burse. Divide the flexor sublimis about its middle, and make a careful section mostally in the axis of the arm, of the anterior retinaculum. The fibrous sheaths of all the fingers

may also now be slit up,

251. FLEXOR DIGITORUM PROFUNDUS OF PERFO-RANS, is a thick, flattened, clongated muscle, simple and fleshy above, separated into four tendons below. It arises from the three upper fourths of the anterior surface of the ulna, and from the interosseus membrane, below the coronoid process, where it bifurcates so as to surround the insertion of the brachialis, sending at the same time a prolongation over the sides of the oleeranon; it also arises from the aponeurosis which goes from the flexor earni ulmaris to the ulna, and from the opper third of the inner surface of that hone. From these different origins, which are all aponcuratio, the muscle, thin at first, thicker in the middle, and becoming this again, descends vertically and divides into four portions, the three inner of which are not very distinct. Each of these portions is terminated by a broad tendon, separated into several slips concealed in the substance of the fleshy fibres, and appearing upon their anterior surface toward the middle of the fore-arm. These tendons become free near the anterior retinaculum, under which they pass along with those of the flexer aublimis, into the palm, where they

descend, separating from each other. At first round and giving rise to the lumbricales, they become broader towards the articulations of the proximal phalanges with the metacarpal bones, present traces of a longitudinal division, pass into the fibrous sheaths of the fingers, through the fissure in the tendons of the flexor perforatus, lodged in the channels which limit it above and below, and are at length inserted, previously becoming flat, into the fore part of the distal phalanges of the fingers. Its covers the fore and inner surfaces of the ulms, the interesseous ligament, the promator quadratus, the wrist-joint, the fore part of the metacarpus, the flexor brevis and adductor pollicis, and the last two palmar interessei muscles. Its ower edge corresponds above to the interior interesseous artery. In action, it bends the distal phalanges upon the middle, the latter upon the proximal, and these upon the metacarpus,

and the hand upon the fore-arm.

252. The accessory muscles of the deep flexors, are called lumbricales. These muscles occupy the middle pulmar region, but had better be described here. The LUMBRICALES, four small, slender, elongated. fusiform fleshy bundles, situated in the palm of the hand, and distinguished into first, second, third, and fourth, according to their relative position, counting from the radial to the ulmar side of the arm; they diminish in size in the same order. They arise towards the upper part of the hand, the first from the fore and outer part of the tendon of the flexor profundus, which goes to the fore-linger; the three following from the separation of the other tendons of the same muscle, so as to be attached to two of them at ourse From thence they descend, following different directions; the middle two vertically, the outer outwards. and the inner inwards; and having arrived at the outer side of the articulation of the metacarpal bones, with the proximal phalanges of the fingers, they become very thin, and terminate by flattened tendons, which proceed behind the three phalanges, become broader, join the tendons of the corresponding interossei, and go, along with them, to be inserted into the outer edge of the tendons of the extensor digitorum communis. These tendons vary much in their disposition; they frequently divide into two, and one of their branches is attached to the phalanx; covered anteriorly by the tendons of the flexor digitorum sublims, by the palmar aponeurosis, and by the collateral vessels and nerves of the flugers. The posterior surface lies upon the interessel, the inferior transversa metacarpal ligament, and the phalanges. In action they bend the fingers upon the metacarpus, carry them a little outwards, and fix the tendons of the extensor communis digitorum. The tendons of the flexor sublimis and profundus and the lumbricales separate the superficial palmar arch from the deep palmar arch.

253. The FLEXOR LONGUS POLLICIS MANUS IS alongated, thin, flattened, thicker internally than externally, situated upon the radius, from the three upper fourths of the anterior surface of which it arises by short aponeurotic fibres, as well as from the neighbouring portion of the interesseous membrane, and even frequently from the coronoid process of the ulna, by a particular prolongation, fleshy in the middle, and tendinous at its extremities. The fleshy fibres, which are all oblique and about an inch long, form a bundle which descends vertically, and are inserted at the back part of a tenden, which they accompany until opposite the pronnter quadratos. This tendon then becomes free and rounded, passes before the carpus, under the annular ligament, with the tendons of the two common flexor muscles. It then descends obliquely outwards between the two portions of the flexor brevis pollicis, passing between the two sessimoid bones. It now passes into the fibrous sheath of the thomb, and termiunter by being expanded over the anterior surface of the distal phalanx of the thumb. Its outerior surface is covered by the flexor digitorum sublimis, flexor carpi radialis, and sopinator longus muscles, the radial artery, and the anterior retinaculum. The pasterior surface lies upon the radius, part of the interesseous membrane, the pronator quadratus, the wrist-joint, the fore part of the carpus, and the flexor brevis pollicis-Its inser edge lies upon the flexor digitorum profundus. In action it bends the distal phalanx of the thumb upon the proximal, and that upon the corresponding metacarpal hone, and the latter upon the carpus. This

muscle and the preceding may now be cut across,

which, with a little dissection, will expose the

254, PROSATOR QUADRATUS, of a quadrilateral form, thin and that. It lies upon the lower part of the fore-arm, and arises by a very thin appareurusis expanded over its inner third, from the lower fourth of the anterior surface and inner edge of the ultra, passes transversely outwards, and terminates at the fore part of the lower fourth of the radius by indistinct aponeuruses. Its unterior surface is covered by the flexor digitorum profundas, flexor longus pollicis, flexor earpi radialis, and flexor carpi ulnaris muscles, and by the radial and alnar arteries. The puterior surface covers the two bones of the fore-arm, and the lower part of the interesseems mumbrane. In action it turns the radius upon its axis from without inwards, and thus pronates the hand. The remaining muscles on the flexor aspect are mostly confined to the palm of the hand, and are generally esteemed difficult. We seldom see the student in his first year make much of them.

255. AEDUCTOR POLLICIS, short, triangular, arises externally by short aponeurotic fibres from the anterior surface of the or scaphoides; internally, from the unterior retinaculum. From thence it descends obliquely outwards; its fibres converge toward each other, and terminate by a short and flat tendon, concealed at first in their substance, afterwards receiving a portion of the flexor brevis pollicis, and inserted at the outer edge of the upper extremity of the proximal phalanx of the thumb, over the book of which it transmits some anoneurotic fibres to the tendon of the extensor secundi internodii pollicis; auteriorla, govered by a partien of the polimar aponeurosis and by the skin; poderinely, it eqvers the opponens, and flexor brevis pollicis. In action it abducts the thumb. Divide the abductor about the middle, and reflect the two partions; this will expose

256. OPPONENS OF FLEXON OSSIS METACARPI POLLICIS, triangular, arising internally from the fore part of the anterior retinoculum, by long uponouratio fibres; externally, from the outer edge of the groupe in the trapezium; and posteriorly, from an aponeurotic septum interposed between it and the fiexor brevis policis. From these different places, the fieshy fibres, which are so much the longer and more oblique the lower they are, proceed downwards and outwards, and terminate by short aponeuroses all along the outer edge of the first metacarpal bone, and sometimes partially on the tendon of the extensor ossis metacarpi policis: anteriorly, partly covered by the preceding muscle and by the skin; poderiorly, applied upon the anterior retinaculum, the articulation of the trapezium with the first metacarpal bone, part of the anterior surface of the latter bone, and the flexor brevis policis muscle. It opposes the thumb to the fingers. The inner edge of this muscle is almost uniformly inseparably connected with the suter portion of the flexor brevis pollicis. Their separation therefore

is quite artificial.

257. FLEXOR BREVIS POLLICIS. Within and beneath the two preceding muscles, short, of an irregular form, and bifureated at its two extremities, this muscle has two separate origins. One arises anteriorly and externally, from the fore and under part of the anterior retinaculum, from the trapezium, and from an aponeurotin septum interposed between it and the opponens pollicis. The other origin, which is posterior, is from the lower part of the as magnum, from the upper extremity of the third metacarpal bone, and from the ligaments by which they are united. The two portions of the muscle descend outwards, separated at first from each other, but soon united behind the tendon of the flexor longus pollicis, to which they afford a longitudinal channel. Arrived at the lower extremity of the first metacorpal bone, they separate anew; the outer joins the tendon of the abdustor policis, and is attached to the fore part of the upper extremity of the preximal phalaux of the thumb, and to the outer sesamoid home of its articulation; the inner is united to the summit of the adductor pollicis, and in like manner goes to be attached to the phalanx and to the inner seamoid hone. These two insertions take place each by a pretty strong tendon. Anteriorly, covered at the middle by the tendon of the flexor longue pollicis; internally, by those of the flexor profundus and by the first two lumbricales; externally, by an aponeurosis, the skin, and abductor policia. The posterior surface corresponds to the first metacarpal bone, to the first two dorsal, and to the first palmar interessed and tendon of the flexor carpi radialis. Its order edge joins the opponents policia, and the inner the adductor. In action it bends the proximal phalmax of the thumb upon the first metacarpal bone, and the latter upon the

trapezium.

258. ADDUCTOR POLLICIS, broad, thin, and triangular, is still more deeply sented than the flexor bravis. It arises from the three inferior fourths of the anterior surface of the third metacarpal bone, between two of the interesseous muscles, by short aponeuroses, to which the fleshy fibres succeed, which descend outwards converging, and terminate in a tendon united to that of the preceding muscle, and attached, along with it, to the inner and upper part of the proximal phalana of the thumb. It often sends a fibrous prolongation to the tendon of the extensor secundi internodii pollicis; anteriorly, covered by the tendons of the flexor profundus, the first two humbricales, and the skin : porteriorly, corresponding to the first three interessei, and also to the skin. In action it carries the thumb inwards, and brings it near the other fingers.

259. Approven (Abdactor) Missisii Digiri, flat. broader at its middle part than at the extremities; arises from the anterior and inferior parts of the os pisiforme, by anoneurotic fibres, continuous with the tendons of the flexor carpi ulnaris. From thence it descends along the inner edge of the fifth metacarpal bone, and is attached to the inner side of the upper extremity of the proximal phalanx of the little finger, by a tenden, which is united to that of the flexor brevis, and sends some fibres to join the inneredge of the tendon of its extensors : autoriarly, covered by the palmaris brevis, a very thin aponeprosis, and the integements; posteriorly, covering the opponent minimi digiti. In action it carries the little finger inwards and forwards, and separates it from the other fingers. Detach this muscle from the pisiform lume.

and reflect it.

260. FLEXOR BERVIS MINIST DIGITI, thin and narrow, arising, by aponeuroses, from the anterior re-

timeculum, and anterior edge of the process of the es unciforme, descends outwards, unites to the outer part of the tenden of the preceding muscle, and terminates along with it. In action it bends the first phalanx of

the little finger. Detach this muscle also.

261. OPPONENS MINIMI DIGITI (Addressor Ossis Metocarpi of Cloquet) has nearly the same form and disposition as the upponens pollieis. Having the same origins as the preceding muscle, its fleshy fibres, so much the langer and more oblique the lower they are, descend inwards, and terminate along the inner edge of the fifth metacarpal bone, by distinct aponeurotic fibres. Its anterior surface corresponds to the adductor and flexor brevis of the little finger, and an aponeuratic expansion, sent off by the tendon of the extensor carpi ulnaris. The posterior swrface is applied upon the last interesseous muscle, the fifth memeurpal hone, and the tendon of the flexor sublimis. In action it carries the fifth memcarpal hone forwards and outwards, thus augmenting the cavity of the palm of the hand. Most of the soft parts may now be so far removed as to expose the interesser muscles; but previous to this, the student may re-examine the arteries and nerves of the arm, fore-arm, and hund, of which he will find an account towards the close of this section.

262. INTEROSSES. These muscles occupy the interrals between the metacarpal bones, and are divided into two sets, palmar and dursal. The Palmar Interosnei. The first palmer is thin and prismatic, arises from the two upper thirds of the inner side of the sacond metaestrpal bone, and from the ligaments by which that home is connected with the trapezoides, forms a tendon, appearing sooner internally than externally, which is inserted into the inside of the upper extremity of the proximal phalanx of the index, and to the extensor tendon of the same finger; anteriorly, covered by the flexor brevis and adductor pollicis; internally, corresponding to the second dorsal interesseous muscle. It earries the fore-finger inwards. The record palmar interornous muscle is also prismatic, arises from the two anterior thirds of the outer surface of the fourth metacarpal bone, and from the ligaments by which it is connected with the neighbouring hones.

Its inferior tendon is attached to the outer side of the proximal phalanx, and extensor tendon of the ring tinger; envered anteriorly by the lumbricales and the tendors of the flexor profundus. It carries the ring finger outwards. The third palmar interusiess wascle is of the same form as the others, and inserted into the two anterior thirds of the outer surface of the fifth metacarpal bone, and into the ligaments by which it is connected with the os uneiforme. Its tendon is attached to the outside of the upper extremity of the proximal phalanx, and of the extensor tendon of the little finger. Its anterior surface is povered by the opponens minimi digiti; the outer corresponds to the fourth dorsal interesseous muscle. It carries the little finger outwards. The Dorsel Leterossei are four in number. The first is the largest of the interessei, and is sometimes called the abdactor indicir. It is of a triangular form, thin, and flat, and arises along the outer edge of the second metacarpal bone, and from the upper half only of the inner edge of the first, as well as from the ligaments which connect these bones with the trapezium. Between these two origins, there exists, superiorly, an interval through which the radial artery passes, forming a remarkable analogy with what takes place in the foot. The two fascienti which arise from them unite, and terminate in a tendon partly attached to the outside of the upper extremity of the praximal phalanx, partly to the extensor tenden of the index. Its posterior surface in covered by the skin; the anterior by the first lumbricalis, the flexor brevis, and abductor pollicis, and by the skin. It draws the fore-finger outwards, and the first metacarpal bane forwards. The second dorsal interessess muscle has the form of a triangular prism, arising from the inner side of the second metacarpal bone, behind the origins of the first palmar interesseus muscle, (separated by a thin cellular line.) from the outer side of the third metacarpal bone. from the ligaments which connect these hones with each other and with the neighbouring bones. Its wayer extremely is perforated for the passage of an artery. The lower is terminated by a tendon, which, like the preceding, is attached to the outer side of the proximal phalanx of the middle finger, and of its exten-

not tendon. He posterior surface, is envered by the skin and the tembers of the extensor muscles of the fore finger, as well as by an aponeurosis which passes from the second meticarpal bone to the third. The univeler surface is warrow, and concealed under the flexor brovis and adductor pollicis. It carries the middle finger forwards. The third dured interessens muscle has the same form as the preceding. It arises from the inner side of the third metacarpal home, from the posterior part of the outer side of the fourth, and the ligaments by which they are connected. At its opper part it is bifureated for the pussage of an arrery. Helow, it terminates, like the others, in a tendon which is attached to the inner side of the upper extremity of the proximal phalanx, and of the extensor tendon of the middle finger. Its posterior enefore is covered by the skin and tendons of the common extensor of the fingers. It earries the middle finger inwards. The fourth dorsal interestess sussele is triangular and prismatic, and arises from the whole inner side of the fourth motocarpal lume, and from the posterior part of the outer edge of the fifth, as well as from the ligaments by which they are connected. Its upper extremity is traversed by an artery; the lower terminates in a tendon which is attached to the inner side of the ring finger. Its pusterior surface is envered by an aponeurosis which goes from the fourth to the fifth metacurpal bone, by the extensor tendons of the little targer, and by the skin; the nuterior is concenled above, heneath the interosseus muscle of the little finger, and appears befor, between it and the second pulmar interesseus musels. In action, it carries the ring finger inwards. Thus all the palmar interness; have single, and all the dural have double origins. From their connextons with the tendons of the extensors of the fingers, the interessei and lumbricales may contribute to extend the fingers. In the dissection of the fore-arm and hand, the mure advanced student should attend to the course of the following vessels and nerves. First, The radial artery. following a talorably arraight course from the bond of the albow to near the styloid process of the radius, placed about the middle of the fore-arm on the propofor teres muscle, and next on the flexor propries pollicis; it next passes to the back of the carpus beneath the tendons of the extensor uses metacarpi pullicis, and extensor primi internodii pallicis, towards the interval betwixt the first and second metacarpal bones. It here sinks deep between the separate origins of the first dorsal interesseal muscle, (the abductor indicis,) and in this way gots into the palm of the hand to farm the deep palmar arch. The artery crosses the palm of the hand, proceeding from the radial to the almir side, situated deep beneath the tendors of the fiexar profundus perforans, and after giving off many branches, it anastomoses by a presty strong views communicues with the olnar artery. This anastomosis takes place beneath the opponens minima digiti muscle. The branches given off by the radial artery from almove downwards, are let, the recurrence; 2d, several muscular branches; Sd, superficialis sular, a small branch which peaces over the origins of the small muscles of the thumb, and generally joins the superficial palmar arch (the ulme artery); 4th and 5th, the anterior and posterior arteries of the carpus; 6th, the art. magasa pullicis; 7th, radialis indicis; 8th, palmaris profunda-The deep radial veins accompany the artery and lie close to it; a branch of the musculo-spiral nerve is found running parallel with it, but not close to it; in fact, the radial artery is not accompanied by any nerve. The effect artery is more difficult of discretion than the radial, and is much deeper than it at first in respect to the muscles, but it becomes superficial lower down-Coming off from the humeral, as has been already mentioned, it posses towards the inner side of the arm to follow somewhat the direction of the ulna-It ultimately forms the superficial palmar arch of arteries, who nee are supplied the arteries of the fingers. Placed at first beneath the pronatur teres and superficial flexors, and on the flexor profundus, it posses down the fore-arm in its lower part, parallel with the tendon of the Sever carpt ulmaris, upon the radial side of which it is placed. It next passes over the anterior annular ligament of the carpus, covered, however, by an expansion of the appropuration of the fore-arm, and placed upon the radial side of the pissform bone. Having thus passed into the hand, still beneath the aponeurasis

it forms the superficial palmar arch, a vessel proceeding from the ulmar side to the radial side of the hand. and placed above the tendons of the muscles. In the upper third of the fore-arm, the alear nerve is separated from the artery by a ransiderable interval, but they approach each other about the middle of the fore-arm, and observards continue nearly the same course; the nerve lies generally on the ninar side of the artery. The deep ulnar veins accompany the artery throughout its course. The branches given off by the ulnurare difficult of dissection. 1st and 2d, The recurrents, improperly called anterior and posterior, they ought to be named superior and inferior. The first is distributed in front of the condyle, the other behind it, Sd. The interesseal artery, the largest branch given off by the alpar. This artery follows the space between the bengs, and is placed close to the anterior surface of the membrana interesses, between the flexor proprints pollicis longus and flexor profundus. It descends as low as the upper margin of the presister quadratus, and there subdivides into two branches. Superincly, it sends back a strong branch called the posterior interosseal; this posses through the opening in the upper part of the interessed ligament, and then follows the course of the extensor communic digitorum. 4th, The ulnar gives off many muscular branches. 5th and 6th, The anterior and posterior carpal arteries. 7th, It terminates by becoming the superficial palmar area. 8th, It gives all the ramus communicans which conneets it with the deep palmar arch; this artery generally passes through the opponens minimi digiti. The digital arteries arise from the convexity of the superficial palmar arch.

263. In respect to the nerves found in the fore-arm and hand, they are of course the continuation of some of those already spoken of. The entancous nerves are removed at an early stage of the dissection: the evolution passes beneath the heads of the promotor teres, descends beneath the flexer sublimis, passes along with its tendens under the anterior retinaculum, enlarges a little at this point, and ultimately gives off branches to supply the thumb, fore finger, middle rager, and use side of the ring fuger. In the fore-arm it gave off the

intermed and several branches to the muscles. The above more may be traced from behind the internal condyle, at first between the heads of the flexor corps about, meat on the anterior surface of the dexer profundes towards the middle of the fore-arm, where it places itself at the side of the ulnar artery, and from this point follows its course. In the land, it supplies branches to one side of the ring-finger and the little finger, previous to which it sends a considerable branch to the land, of the land. The musculo-spiral may be traced from the surface of the impirator brevious plang the radial artery; its ultimate distribution is to the back of the land, and superiorly it gives off the posterior internance.

PART V.

DISSECTION OF THE THORAX AND ITS CONTENTS.

264. The dissection of the Thomax should be undertaken immediately after that of one of the extremities. In the division of the subject usual in dissecting rooms, the thorax and its contents fall to be dissected after the removal of the arms, or thoracic extremities; thus all the great muscles covering or adhering to its osseous walls, have probably been entirely removed.

266. Thorax viewen Extensally. The student for the first time, perhaps, getra view of its actual form when the shoulders and limbs have been removed, and he will find it quite unlike what he anticipated, unless indeed he has previously given the skeleton a more than optimary share of his attention. If the student has really neglected this part of the articulated skeleton, he will find it an unprofitable waste of time to direct the recent subject. If the cavity of the abdomen happen to have been previously laid open by another director, the student about to examine the

thorax, should explore the position of the diapleragu-(septum transversion, midriff) and how far it ascends into the chest, contracting, as it were, that cavity most where least expected, separating it from the cavity of the abdomen, and thus forming its base. At this period of his dissection, he should carefully go over with the demonstrator, or with a move advanced student, the attachments of all the museles to the osseous walls of the thorax; and he should, by clearing these attachments, endeavour to verify all the facts, and to make himself master of the precise insertions or attachments of those muscles, and the limits of each. The muscles which have an attachment to the osseous walls of the thorax are as follows: Trapezii; splenii; complexi majores; spinales dorsi; saero-lumbales ; langissimi dorsi ; s-mi-spinales lumlarum ; serratil post ci superiores, infersores, et magni : rhomboldei ; intermistales interni, externi ; scalcui ; sterno-mastoidei ; sterno-thyroldei; sterno-kyoidei; triangulares sterni; levatores costarum; external and internal abdominal ublique muscles; transversi abdominis; reeti, psom, quadrati lumborum; disphragm; pectorales majores et minores. Having gum over these two or three times, and studied their actions, (the only way by which he can ever hope to remember them.) her him next, having surveyed the form of the useous thorax upon a skeletun, proceed to the dissection of the intercostal unuseles,

266. INTERCOSTALIN EXTERNI, eleven in number, aituated in the internestal spaces, from the vertebral column to the union of the ribs with their cartilages; thin, and bornewing their form and breadth from each of the spaces receiving them; attached above to the outer lip of the lower edge of the rib above, posteriotly to the transverse process of the vertebra with which that rib is articulated; tendinous bundles are prolonged between them, and multiply their points of insertion; they descend from thence obliquely inwards and forwards, and terminate at the upper edge of the lower rib, partly in the periosisum and partly in small aponeuroses with which they are interlaced; those of the upper intercostal muscles are less oblique than those of the lower, and they are more an posteriorly than before. A delicate aponesmosis continues the muscle,

as it were, as far as the sternom, by occupying its place: the fibres of this aponeurosis are occasionally very distinct. Externally, covered by the two protoral muscles, the serratus magnus, obliques externos abdominis, serratus posticus, superior and inferior, szera-lumbalis, and longissimus dorsi, the pleura lining their internal aspect from the tuberosity in the angle of the ribs. Where the plears are reflected, the external corresponds to the internal intereastal muscles, separated by a thin layer of cellular tissue, and by

the intercostal vessels and nerves.

267. INTERCOSTALES INTERNS, cleven in number. like the external intereastals in form and breadth, but only extending from the angle of the ribs to the sternum. Their fleshy fibres are equally intermingled with aponeuroses; but they descend obliquely tackwards, and thus decassate the external, or take an opposite direction, and are inserted above into the inner lip of the lower edge of the ribs and their cartilages, and below into the limer part of the upper edge of the ribs and cartilages; they are less oblique than those of the external intercostal muscles. Externally covered by the preceding muscles, and in connexion with the intercostal vessels and nerves, which are placed between the external and internal intercostal muscles; intervally lined by the eleura, and a thin layer of a pearly fibrons cellular tissue. The intercustales externi and internihave the same uses; they raise or depress the ribs, in the motion of inspiration or expiration, according as the upper or lower rib is the point from which they act. On the back part of the chest, running from the transverse processes of the dorsal verteless to the ribs, the levatores costarum are met with.

268. LEVATORES CONTABUM. Each rib receives from the summit of the transverse process situated above that with which it is articulated, a small, flat, thin triangular this bundle; these, to the number of twelve, form a series which extends along the posterior part. of the trunk; they are directed phliquely downwards and forwards, and attached by appropurous latermingled with the fleshy fibres, to the upper edge of the rib below, and pressionally to that of the next by means of an appendage which posses over the posterior

costo-transverse ligament. The upper are smaller and thinner than the lower, and the first arises from the last cervical vertebra. There are also observed, in various places of the inner surface of the thorax, small muscular planes, which vary much in request to number, size and situation; they descend obliquely backwards from one rib to that which is beneath, or to that which follows it, and have been unused infracostales. In action they raise the ribs, and are subservient to inspiration.

269, THORAX VIRWED internally. The interior of the thorax is not so extensive as its external dimensions would lead one to suppose; this is awing to the ribs shutting in as it were, and forming or assisting to form the hypochondria, and thus contributing (though indirectly) to form a part of the abdominal parietes likewise. The cavity itself extends from the lower part of the neck to the abdomen, and contains, 15. The lungs. 25. The pleater, two in number. 35. The heart and pericardium. 4". A considerable numher of arteries, veins, lymphatics and nerves, either belonging to the class itself and its contained organs, or passing through it in an upward or downward direction; thus purtions of very important organs are found within it, such as the greater part of the gullet or osophagus, of the norta, of the thoracic duct, &c. The boundaries are as follows: anteriorly, the sternum and custal curtilages; laterally and posteriorly, the ribs, intercostal muscles, and dorsal portion of the spinal column; inferiorly, the disphragm; superiorly, the eawity of the therax would open into the lower part of the neck, were it not for the plearse, the scaleni and other muscles, and the passage of the tracker, gullet and large vessels filling up the rather contracted passage called the superior aperture of the chest. Upon the whole, now that the extremities are removed, the thorax will be found to resemble a cone somewhat transpared above. flattened behind, expanded believ, with an extremely sloping basis (the disphragm) towards the abdomen. Through the superior aperture of the thorax whose boundaries are the first rile and their eartilages,

the sterman and inter-clavicular ligament, there pass the following parts: the stermo-leveld and thyroid muscles, the venue innominates, the phrenic, and eighthpairs of serves, the sympathetic system of nerves, and the america branch of the first duryal, the brachin-rephalic artery, left carotid and left subclavian arteries. and the superior intercental vessels, the traches, the gullet, the thoracic duet, the longi colli muscles and the anterior common ligament of the vertebral column-Opensionally also may be seen ascending the middle thyrold vessels. Through the inferior or hear, the vena cava inferior, and the gullet; the north, thoracic duct and azygos vein pass from the thorax into the abdomen, but behind the diaphrogra. The boundaries of the circumference of the basis or inferior aperture of the thorax are anteriorly and faterally the siphoid process of the stornum, the cartilages of the seventh, eighth, winth, tenth, eleventh and twelfth riles, and behind the spinal column.

270. The thorax requires to be apened systematically. and we recommend the following procedure to be adapted; cut through the cartilages of the second, third, fourth, fifth and sixth ribs on each side, close to their connexion with the ribs; likewise the intercestal muscles and pleure in the same line of incision, introduce the fingers cautiously into the opening so made, in order to protees the displayin inferiorly, and carefully tear through any adhosions which may exist between the contained organs and the walls of the thursts. Divide the first pair of intercostal muscles on each side till within about two or three inches of the spine; next saw the ribs a little anterior to their angles so as to allow of the removal of a large portion of the walls of the there; by this means the student exposes the interior of the chest most favourably for taking up a current idea of the mechanism of the interior, the position of the lungs, the nature of the partition dividing the close into two pavities having no communication with each other. As soon as he has thus removed a sufficlently large partion of each side of the walls of the close, leaving the first and last two ribs untouched, the student may proceed to examine the pleure, and the form and position of the lungs themselves.

271. The Parties (two in number) are secons membranes investing the interior of the chest, and giving a partial covering to the lungs and to other negative situ-

ated within the cavity. A pretty firm rellular substance. connects their external surface to the intercostal muscles, the ribs, the lungs, the pericardium, or whotever parts they invest; on their inner surface they are uniformly smooth, thin, and as it were polished, and farther heafewed with a seriesity as all serous membranes are, Each pleura, if dissected from every part it covers, would present an empty sac without an opening late it; this was first proved by Mr. Hunner. The older anatomists not understanding this mechanism, colled that part of each pleara covering a great part of the lungs, the pleara pelmogalia, and the portion connected with the ribs, pleura coatalit; these terms, as conveying inaccurate ideas, ought to be discontinued. The pleurevary in thickness at different parts, as the student will observe on dissection. It will be proper for the studeat to trace each pleura in the following manner;-Proceeding from the starnum, the pleure direct themselves outwards, line the inner surface of the ribs, their eartifages and the muscles which occupy their intervals, separated, however, from the latter by the intercostal vessels and nerves, and by adipose collular tissue. They thus advance as far as the vertebral column, reflected inferiorly over the disphragm, where connecting the inferior labe of each lung to that muscle, there is a process of pleara called the Ligamentum Lating Pulmonis: they cover the thoracic surface of the diaphragm, and superiorly pass under the upper ribs, belaind and above which they form a cul-de-sac for lodging the summits of the lungs. Towards the articulations of the ribs with the vertebra, they are applied upon the thoracie nervous ganglia and their branches, and then direct themselves over the lateral parts of the hodies of the There, the pleura of the right side upproudies to that of the left, but there remains between them a narrow and irregular triangular space named the Posterior Mediastinum. Anterior to this space, the pleurse, though very close to each other, do not yet come into contact, but pass to the sides of the perlearding, cover it at first over a small extent, and are reflected over the posterior part of the pulmonary vessels and over the lungs themselves, covering at first their convex surface, their summit and base, diving deeply into the

interiobular fissures. From thence they return upon their plain surface, the anterior part of the pulmonary vessels, and the other portion of the sides of the pericardium, at the fore part of which they again approach such other. They then gain the posterior surface of the sterouse, and the point whence we have considered them as setting out, intercepting between them a space not parallel to the sternum, but inclined from above downwards and from right to left, broader below than above, very narrow at its middle part, named the Auterior Mediastinum, (273.) The plaume are easily detached from the sternum, rile, interesetal muscles, and sides of the vertebral column, but are united it a more intimate manner to the surface of the lungs, although there exists between them and the parenchyma of the organ, a rather dense membrane composed of cellular tissue. They are connected in a loose manner with the anterior and posterior parts of the lateral ourfaces of the pericurdism, but on their middle region, and opposite the pulmonary vessels, they adhere with extreme firmness. The inner surface of the pleurar is smooth, polished, moistened by a serous fluid, and free of all adhesion in the natural state. By builing, they lose their transparency, and acquire an opaque opaline On the sides of the draphragm, they present small adipose appendages (appendices epiploine of the plearur) similar to these described as occurring on the large intestine, and they are a little thicker at the posterior surface of the chest than at the autorior. By inflammation, very close adhesion may take place any where hetwixt the smooth surfaces of the parietal and visceral portions of the pleame, so as entirely to oblinerate what is called the envity of the pleurn. Such adhesions render penetrating wounds of the thorax more dangerous than they otherwise would be. The arteries of the plenracome from the intercostal, luternal mammary, phrenic, inferior thyroid, thymic, pericardiae, and bronchial arteries. The veius exactly correspond to the arteries. A prodigious quantity of lymphatics is perceived in these membranes; but no nervous filaments have yet been traced in them. The student will by this time have remarked that there must exist a space between the right and left please, extending from the internal surface of the sternum to the front of the dorsal vertebrar; this space contains the pericardium, heart, &c., and is generally called Mediastians or Mediastian, for there are two, and according to some, three. The best made of examining these cavities intermediate of the plearse, and which form by their walls a partition of varying breadth across the centre of the chest from before backwards, is as follows:

272. Mediastina. The mediastina then are three in number: 1°. The saterior, lying behind the sternum and before the pericardium. 2°. The middle, containing the pericardium and heart, and bounded before by the anterior mediastinum, behind by the posterior one. 3°. The pasterior, lying in front of the vertebral column. But the walls of these cavities are simply formed by the please passing backwards from the servaum to the spine.

273. The ANTERIOR MEDIASTENUM. Saw the sternumaeross in the lower part of its body, a little above the ensiform process, and begin to raise it up, the cartilages at the ribs having been already cut through. As this is being done, the pleure forming the right and left walls of the anterior mediastinum must be entenutiously, and the student looking in below the sternum as he raises it up, will see a cavity gradually unfold itself: this is the ravity of the anterior mediastinum. The stermum may then be removed in this way altogether, and the region being fully exposed, its form may be examined. It does not exactly follow the axis or direction of the sternum, but inclines to the left side, owing to the position of the heart and pericardium, (the right wall being nearly straight, and the left descending rather to the left side,) broad above, belond the manubrium, narrow in the middle where the pleurse all but touch each other, and broader again below, immediately above the diaphragus. It almost forms two triangular acanes, the base of the one being above, that of the other below, and the common apex in the centre. It has been very incorrectly compared to the letter X. whereas it is precisely of this shape) . On the inner side of the manubrium of the steramn just removed, the student will find the attachments of the sterno-hyoidei and sterno-thyroidei museles, and some remains of the thymus gland, lie in this part of the mediastinum; likewise a few lymphasis glands, and much reliular substance; laterally and close to the arrange the internal mannery vessels, and trangulares sterni muscles.

274. This voca ants Strains, arising from the edge of the ensilier cartilage and sternum, up in the articulation of that home with the fourth cartilage, by means of apponentation there would be fourth for the best filters; from thence woulding outwards, to be attached by so many digitations to the edges and inner surface of the cartilages of the third, fourth, fifth, and sixth ribs. Covered anteriorly by the cartilages of the four last true ribs, the inner intercestal meaches, and the internal mammary vessels; the posterior surface rests upon the pleura, and in a small part of its extent upon the diaphragm; its inferior edge or base is multipuous to the transversalis abdomins. In action it draws the cartilages of the ribs, to which it is attached, backwards, inwards, and downwards, and assists exspiration.

275. The captions dissection of each pleara from the pericardium, as far back as the root of the longs, should now be made, and the close adhesion of these two membranes at certain points, (towards the middle) and the laxity above and below, cannot fail to be noticed.

It is here that the pleure are thinnest-

276. Manual Manuary Sent. This envity is easily, understood; it contains the pericardium, heart, and a partion of the large vessels on its outer side. The phrenic nerves and orderia conta nerve phrenici may be seen lying betwint the plearne and pericardium.

277. The Pasymnon Management extends from about the third dorsal vertebra to the tenth behind the perimredium, and in front of the spine. It ought to be examined in three ways; I', from the right side by drawing the right long apwards and forwards out of its enviry; B', from the left side by drawing up in like manner the left long; B', after the examination of the heart in alu. The student having removed that organ altogether, may then examine the pasterior unclinstimum, by cutting through the lack part of the perseardium, and dissecting it from the front backwards towards the spine. He thus examine fail to understand the mechanism of this cavity. Its walls are formed by the plants; posteriorly it is bounded by the bodies of the

dorsal vertebrae; anteriorly, by the back of the perieardium. In it there by the asophagus, the descending portion of the thoracic aorta, the eighth pair of nerves, the thoracle duct, the venn azygos of the right and left sides, the splanchnic nerves, towards the lower part, several lymphatic glands; the division of the truchea inferiorly, and the commencement of the bronchial tubes, The pourse of these important parts, and their connexion with each other, will be best understood after the dissection of the heart and pericardium, but the student may previously to the complete examination of the contents of the posterior mediastinum, dissect and examine that cavity on the right side and on the left side; and, first, on the right side, draw the right long out of its cavity, and lay it over towards the left side; make an incision through the right pleurs, close to the root of the lungs, and reflect it towards the ribs ; clear away a little cellular substance, and expose the following parts. The exceptages will be observed close to the front and mestal part of the column; it enters the thorax from the neck behind the trucken, and to its left side, passes under and behind the arch of the aorta, and desoends mesially and to the right of the north, until it renches the diaphragm, through which it passes to enter the stomach. The critics in the diaphragm through which it passes, is called the asophagoal ordice, and is formed anteriorly by the cordiform tendou, laterally by the pillars of the diaphragm; posteriorly the decussating fibres separate it from the aorta. Whilst in this course the eighth pair of nerves, the resophageal plexus, and cords (portions of the eighth pair,) are united with it by cellular substance; inferiorly it dilates somewhat hefore joining the stomach. The student should distend the gullet with air to have a good view of it. The eighth pair of nerves are also proceeding towards the stomach, and pass through the disphragm by the same opening with it, the left nerve more anteriorly, the right more posteriorly.

A. The Thonacic Duor, lying towards the right of the guilet, imbedded in cellular and adipose no embrane, and so close to the ploura as to be very often removed along with it by the incantions dissector; behind it lie the right intercestal arteries, and some of the left inter-

costal veins, more especially a small partion of the left vena azygos; the right azygos vein lies close to it, but towards the right side. Although the full description of this vessel properly belongs to the absorbent system, where the student will find its minute descriptive anatomy, it may not be amiss to offer a brief account of it here. The thoracic duct is the great terminating vessel of nearly the whole of the absorbent system of vensels, including lacreals and lymphatics. It commences in the abdomen on the second or third lumbar vertebra, and behind the norta by a dilatation, called receptaculum chyli; contracting in calibre to about the size of a erow quill, it passes from the abdomen into the thorax by the nortic opening of the diaphragm, gets into the posterior mediastinum to the right side of the north; it then ascends between the north and the year azygos imbedded in fat, but anterior to the intercostal vessels, as already mentioned; opposite to about the fifth dorsal vertebra, it passes obliquely behind the gullet, and arch of the norta, and ascends in the neck behind the left jugular vein and left carotid artery, as high as the sixth corvical vertebra, thus passing from the right side of the thorax to the left side of the neck; it next bends downwards and enters the left subplayian vein, near the point of its junction with the corresponding jugular vein. The thoracie duct abounds with strong valves, allowing the contents to pass only in one way, that is from below upwards; by opening it low down in the thorax, the student may distend it with air, by blowing from below upwards ; its tonics are nearly transparent. although they have by some been supposed to be museular.

3. The Reger Vena Azygos (rene size pari, East.) is also found in the posterior mediastinum on the right side; it commences in the abdomen by a branch or two from some one of the superior lumbur veins, or from the inferior cava or right common iliae vein, enters the thorax behind the disphragm by its angle opening, covered by the right pleurs, and ranning up parallel with the thoraxic duet, it arches forward apposite the third or fourth dorsal vertebra, over the root of the right long and right broughns, and opens into the superior years cava just as that versel is

about to pass through the fibrous pericardium. In this course, the right sona naygos, like most of the deep veins of the trunk, has no valves, and may be injected with air from above downwards, in order to shew its course, and the branches or veins which pour their blood into it. These are the bronchial, exoplageal, and many of the intercestal veins, and a vein, or sometimes two, which come from the left side opposite to about the sixth dursal vertebra, viz, the left azygos; this passes behind the aorta to join that of the right side.

c. The Spianchisic Neaves lie somewhat in the posterior mediastinum, towards its lower extremity. These acrees are merely filaments of communication between the thoracic gaoglia of the sympathetic system of nerves and the great abdominal semilunar ganglion and solar plexus. They commune by four or five filaments from the liftle, sixthe seventhe and eighth of the thoracic ganglia; these units to form a single trunk, which passes through the displangment varying points, enters the absorber, and there joins the semilunar ganglian; a smaller splanchnic generally arises from the teath and eleventh thoracic ganglia, whose course resembles the greater splanchnic, but usually joins the

renal plexus.

D. The TRORACIC GARGLIA and Sympatheric System of Negrees. These ganglia will be found external to the posterior mediastinum and plenra; there is usually a ganglion opposite to the head of each rib, and a filament of communication with the one preceding and the other following, thus connecting all these ganglia invariably with each other, and the first one with the last cervical ganglion of the same system of nerves; the last thurseld ganglion sending a communicating filament through into the abdomen, behind the disphragm, connects the last thoracic ganglion with the first lumbur: I have found this connection invariable, contrary to the opinions of Bichat and Haller. The sympathetic system of nerves thus enters the thorax from the neck, close to the cervis of the first tile, and quits it by passing behind or through the disphragms but usually behind the internal ligamentum arcuatum, close to the inner margin of the papas,

as has been described. The right bronchial tube and the division of the tracken had better be examined whilst examining the lungs, after the dissection of the povicardium and hourt. Besides the organs already described, the student will find on the right side of the chest, the corresponding nortic intercostal arteries between the intercustal spaces, also the dorso-spinal nerves; and in the apper part of the chest, descending over the neck of the first rib, the subclavian intercostal artery. This would supplies two or more of the superior intercostal spaces. The anterior branch of the first pair of dorsal spiral nerves ascends upwards over the same rib to join the brackial plexus. In order to examine the posterior mediastinum on the left side of the thorax, raise up the left lung, drawing it over towards the right side; remove the plears, and find the following structures: 1º. The descending portion of the thoracic north, 2º. The left venn azygos. 35. The splanchnic nerves: 45. The thoracic ganglia of the sympathetic and their communicating filaments. 5°. The left dorso-spinal perves. 6". The left interestal arteries and veins. The description of all these parts (excepting the aorta and left vens azygos) resembles, with but trifling differenees, that of the analogous parts on the right side, and need not therefore be repeated. The aorta and left venn azygos require a separate brief description at this stage of the dissection. The descending portion of the thoracic north enters the posterior mediastinum about the left side of the third, sometimes the fourth, or even the fifth dorsal vertebra; on the body of that bone; it not unfrequently makes a distinct impression and despends along the left side of the bodies of the remaining dorsal vertebra; on the eleventh and twelfth, it passes betwist the crors of the disphragm into the abdomen, of sourse altogether behind the muscle, and losing its name is called, from this point downwards, the abdominal aorta. In this course there arise the following arteries from it: 1". The broughial arteries. 2. The asophageal, 3. The aertic intercostals. These tends will be excelelly described immediately.

E. The LETT VESA Avvious arises in the abdomen from some one or other of the lumbar voices; like that of the right side, it has no valves. The lower intercestal veins generally contribute to form it, and there is sometimes a descending suggest of this side collecting the apper intercestal veins; they then cross behind the aprin to the right side, and enter the right rem azyges about the middle of the chest. It has been already remarked, that before the student can complete his view of the posterior mediastinum and its contents, the pericardium and heart must be dissected and examined. In this examination there are two stages; list, the examination of each part in sile; 2d, the removal of the heart from the pericardium, by carefully catting through its great vessels just as they

are about to pass through the pericardium."

278. The Penigannium, or fibro-serous envelope of the heart, is a membranous bag, composed of two laminos, an outer or fibrous, an inner or serous, which envelopes the heart and the arterial and venous tranks which issue from, or enter into it. It is lodged in the middle mediastinum (276), above the central annneurosis of the diaphragm, to which it is strongly united. Its external form is, at first sight, that of a cone, with the base directed downwards and a little to the laft, while the sommit looks upwards, backwards, and to the right; but when freed of the fat in which it is, as it were, Immersod, it is found to be exactly moulded upon the heart. Anteriorly, the pericardium is covered by the pleum, excepting in its middle part, where it corresponds to the anterior mediastioum and to the thymns gland, and by intervention to the sternum and cartiloges of the last sterno-costal ribs of the left side, from which it is separated laterally by the fore part of the lungs. Pasteriarly, it is of a very small extent, and rests upon the bronchi, osophugus,

Although, in accordance with the usual descriptions of authors, we have spoken of the anterior and posterior medianticum as extending up as high searly as the level of the upper part of the manufactum of the stemum; jet in paint of fact, there is no natural division of the cavery lying immediately behind the manufactum of the stemum; se or other terms, it is the pericardism and heart which, properly speaking, separate the anterior from the posterior mediantimum; above this the division would be perfectly artificial.

and descending north. To the right and left, it is connected by cellular substance with the please, the phrenic nerves, and the internal surfaces of the lungs. Inferiorly, it corresponds to the apeneurotic centre, and a little to the left, to the fleshy libras of the diaphragma-The unite or Abrous membrane is intimately united below with the aponeurosis of the disphragm, it ascends around the heart, which it embraces as far us its base, and there is continued to a greater or less distance upon the great frunks of the vessels, dividing into several distinct sheaths which accompany them to a certain distance. The pericardium, therefore, is in one sense not perforated to allow these vessels to pass, as many anatemists have alleged; but its fibrous lamina loses itself insensibly on their walls, and even seems to be united with them. These sheaths are eight in number : one, which is very short, for the vena cava superior; four, still shorter, for the polymanary veins; one, which is indefinitely prolonged, for the aorta; two for each branch of the pulmonary artery. The vena cava inferior penetrates the diaphragm, and immediately enters the right nuriele of the heart, and has thus no tibrous sheath. This membrane presents the greatest resemblance to the dura mater in its atructure, only it is not so thick. Its colour is pearly and aponeurotic, Its fibres are sametimes coluted, often collected in distinct bundles, of variable thickness and breadth, irregularly disposed, and erossing each other in all directions. The greater number, however, asepad vertically and parallel to the axis of the pericardium. To examine the fawer or serses membrane of the perioardium, the bag must be laid open extensively an its anterior surface; in this way the student opens the cavice of the pericurdium, by cutting through both its layers, and is coulded to examine and trace its sernus layer. The serous membrane has a much more extended course than the fibrous membrane, as, after lining its inner surface, it is reflected over the heart and covers it entirely, without, however, containing it in its interior, in which respect it is similar to the other serous membranes existing in joints, and the plears in the thorax; but it has always opposited to us, that the filmous layer is interpreted between the service layer.

and the diaphragm." Lining the parietes of the fibrous membrane to the place where the latter is prolonged upon the great vessels of the lease of the heart. it is reflected upon the sorts, above its first curve; to the left upon the pulmonary artery, before its bifurention; to the right upon the year rave superior, about an inch above its entrance into the surjete, and on the right pulmonary veins, immediately after their issuing from the lung. It covers the surface of all these vessels, penetrates into their intervals to a greater or less distance, and invests the north and pulmonary artery in their whole circumference, excepting the place where they are in immediate contact. It also covers, between them, the ductus arrevissus, or the ligament by which it is substituted. In the place where this membrane is reflected, the separation of the two lamime of the pericardium may be very distinctly seen, a very perceptible triangular space existing between them. Having arrived at the base of the heart, the serous membrane proceeds directly from the pulmumary artery over the ventricles, and from the vena cava over the right auriels. On leaving the norta, it is prolonged into a depression which exists between that artery and the right anciele, whomee it also diverts itself tuwards the ventricles. From the summit and edges of the heart, it goes to its posterior surface and covers it, ascends again to its base, embraces it to the right and helow the venz cava inferior, to the left and above the left pulmonary veins, and is reflected over the posterior part of the fibrous membrane. This membrane dives into all the irregularities which the heart presents at its surface, where it is so thin and transparent, especially upon the ventricles, that it becomes very difficult to demonstrate its existence, excepting in the places where it is separated from the fleshy fibres by adipose tissue. It aitheres intimately to the filerous membrane, and can only be detached from it in points of small extent, or as the place of its reflection. It has very little attachment to the vessels, and one easily be raised from their surface. The inner

Mr. H. Gloquet thinks that it is applied directly, and in a very close manner, upon the spaneurous of the displaym.

surface of this membrane, which is everywhere in contact with itself, is smooth and polished, and continually moistened by a screen fluid, the liquor pericardii. This liquor may amount to several ounces, and yet not constitute the hydrops pericardii. The arteries of the pericardium are very small, and arise from the thymic, phrenic, branchial, and ocophageal arteries, the coronary arteries of the heart, the internal mammary arteries and the aerta itself. Its veius correapond to the arreries, and partly terminate in the vena aryges. Its lymphatic vessels go to the glands which surround the vena cave superior, and the origin of the aurta. Nervous filaments have not yet been traced

into the substance of its luminos.

279. The HEART (Car), should first be examined in sity, all its parts named, and its relative position direction, form, &c. carefully noted. The following description may be read over before the student commences cutting into any part of it. The heart is the centre of the circulation; it is a hollow muscular organ of an irregular conical or pyramidal form placed obliquely between the lungs, inclined forwards, downwards, outwards and from right to left, flat posteriorly and inferiorly, convex anteriorly and superiorly, and lodged in the pericardiam. Its volume varies much in different individuals. Its mass, compared with that of the hady, is very small; but, in general it is so much the greater the younger the subject is. Although it is retained by the pericardium, the mediastinum and large vessels, its situation changes every moment during life, because its weight drags it in different directions, according to the position that is no amed, and must also be slightly affeeted by the mutions of the diaphragus and the different states of inspiration and expiration. Its unterior exclude, which is turned a little upwards, is convex, and presents, in its middle, a groove which traverses it. obliquely from above downwards, and from left to right, and in which are lodged the anterior corogary artery and rein, in the midst of a considerable quantity of adipase theme. The portion of this surface which is situated to the right of the groove, is much brander than that in the left. This groove marks the instition of the soptum ventricolorum. Its materiar surface is

directed downwards, and is nearly horizontal. It is flat, and rosts upon the aponeuratic centre of the diaphragm, from which it is separated by the pericardium, but according to Cloquet by its serous membrane only. It is traversed nearly vertically by a grouve which receives the pasterior coronary artery and vein, and which joins the preceding at the apex of the heart. The portion of the posterior surface of the heart which is to the left of the groove is much broader than that which occuples its right side. The right wargin of the heart is at the same time inferior. It is thin and sharp, longer than the left, and resting upon the disphragm. The left margin is directed backwards and upwards; it is olitiss, rounded, very thick; the posterior coronary artery may be seen on it. The base of the heart, which is situated above, behind, and to the right, slightly inclined from above downwards, and from left to right, is separated from the vertebral column by the aorta and assophagus, and is connected with the pericardiam through the medium of arteries which issue from, and of wins which go to, it. There is observed upon it an ablique groove, which indicates the junction of the auricles and ventricles. The wound or apex, which looks forwards, downwards, and to the left, is lodged in a notch of the long of that side, corresponds to the interval of the cartilages of the fifth and sixth ribs, under which the pulsations of the heart may be easiest felt; close to the apex, but always rather to the right side, is a depression, in which terminate the sules or grooves seen upon the anterior and posterior surfaces of the heart. Thus, the apex of the heart is to a certain extent hiffel, more so in some individuals than in others. but much less so in man than in certain of the lower animals, as in the dugong. The heart consists of four cavities, named nextricles and asricles. The two auricles occupy its base, or its superior and posterior region, the two ventrieles its inferior part. An auricle and a ventricle are placed to the right, and to the left the same disposition is observed. On each side, the auricle communicates with the corresponding ventricle; but the right cavities soldom communicate directly with the left in the natural state and after birth. In the right earlies there is found black blood, which

is to be submitted to the action of the air in the lungs. In the left there is found red blood which has already undergone this action. The circulation of the blood through the heart may readily be traced by the studeat in this manner. Before laying open any of the cavities of the heart, blow air into the superior vents cays, and comprous the inferior rays as it passes through the displarages. He will thus distend these veins, the right auriolo, the right ventricle, the palmonary artery, and its right and left branches proceeding to the lungs, and thus prove that the dark blood proceeding from the body into the right auriels of the heart by the two years cave, passes readily from the auricle into the ventriele, and from the ventriele into the pulmonary artery, and through its ramifications into every part of the lungs. It (the blood) is there altered by exposure to the action of atmospheric air, and from being dark becomes of a florid red colour, in short, from being venous blood, becomes arterial, or is arterialized. It returns from the lungs be the right and left pulmonary veins, (which the student will notice at the root of the lungs.) to the left quriele, is poured by at into the left ventricle, which again by its violent action drives it into the aurta and its branches, and in this way the arterial blood waches every part requiring nourishment, to return again altered and wasted by the proceases of narrition through the veins, to the right anriels of the heart from which we have just traced it. This is the double circulation of the blood discovered by Harrey.

A. Resire Armera. The right societe (Auriente derira son auterior) occupies the inferior, right, and anterior part of the lose of the heart, and rests upon the diaphragm; its form is very irregular and difficult to be described; transversely elangated, it presents its greatest breadth to the right and behind, its mirrowest part before and to the loft, in which latter direction it is protonged by a flattenest losse appending (proper mericle), terminating in a point, irregularly dentated on its edges, and placed transversely between the acrts and the right ventriele; it is in general wider than the left auriele. Its uniter anylose is free externally; but internally it is united with the left auriele, holow with

the right ventricle, behind with the orifices of the two venue cavas. Anteriorly, it is surmounted by the anpendage mentioned above. Lay open its interior by an incision in its long axis, cautiously avoiding coming too near the orince of the inferior cava. Its onser surface presents proteriorly at its upper part the orifice of the venn cava superior, directed obliquely forwards and dawnwards, and femished with a rounded, thick, and fleshy projecting edge, more distinct and stronger posteriorly than anteriorly; this prifice is narrower than that of the year cays inferior, which is situated below and more behind it, and which is directed obliquely upwards and inwards. These two apertures are very close to each other, and are even continuous by a portion of their eircumference; in this common portion there is sometimes observed a more or less distinct subcrele (Tuberculum Loweri), which is merely a prominence formed by fat or by a fleshy bundle. Near the orifice. of the venn cava inferior, and to the left side, is the Endacking Valve, The breadth of this valve varies much in the adult, but can never entirely close the aporture of the vein; its dimensions are more considerable in children, and supecially in feetuses, and it hecomes gradually obliterated with age, so as to be very indistinct in old persons; its position is nearly vertical, and its form semilunar; its posterior surface, which is directed backwards, to the right and upwards, corresponds to the envity of the venti cava inferior; the auterior, which has an opposite direction, corresponds to the envity of the nuriely; its five edge, which looks opwards and backwards, is sometimes reticular; it is more or less concave, but is always very thin; its right extremity is connected with the eigeninference of the tems cave inferior, while the left is prolonged upon the inner wall of the agricle, and is continuous with the anterior pillar of the fassa avalis, of which we shall presently speak. Under the Eustachian valve, and above the entrance of the ventricle, is the common aperture of the coronary veins, which is also furnished with a semilunarvalve, the valve of Thelessus broad enough to cover it entirely, the five edge of which is directed downward. it, Anteriorly at its oppor part the small envity of the appendage, remarkable for the prominences which are

formed in it by a multitude of fleshy columns (unaculipertinute) crossing each other, and inferiorly, the wide aperture by which the two right cavities of the heart communicate (right unresults sentricular opening.) This aperture is diventar when the heart is full, ciliptical when it is empty. A cartilaginous ring surrounds this swiffice. 3:, The owier side presents nothing remarkable but a great number of irregular prominences, formed by muscular bundles which leave between them speces of various dimensions, and of which the principal are in general directed from behind forwards. These prominonces are commonly less numerous than in the appendage. 42. Internally there is a septum separating the right auricle from the left (septum auricularum.) In the adult it presents under its middle part a depression (force ocalis a vertigiom for aminis newly), which is more distinct above than below, where it disappears insensibly, becoming continuous with the rena cara inferior. The surface of this depression is sometimes annuall, sometimes uneven and reticulated. It does not appear to have any fixed limit behind; but, autoriorly, it presents a kind of very thick semilunar valve or annulus of which the inferior extremity is continuous with the Lostachian valve. By its inner surface, this valve correspands to another valve which projects in the left puriele, and forms of itself the bottom of the fossa ovalis, On pushing from behind forwards the handle of a scalpel ur a fine probe between these two valves, a passage is, for the most part, easily obtained from the right auricle into the left. In the space perspired in the adult by the fossa ovalis there is in the firtus on operture, the former wate (Former of Botal), and which sometimes remains open after birth. Its use is to transmit, before the period of birth, the blood of the rena cava inferior directly into the left agricle. There are observed margaver, in the whole extent of the inner surface of the right suricle, a great number of small orifices not furnished with valves (foruming Thehesii); which are supposed to belong to the veins of the walls of the heart.

The Right VENTRICLE (Fentricular dester son network) Wider and broader, but less extended in length than the left, at the right and anterior part of

which it is simused, the right ventriele has a considerable resemblance to a triangular pyramid, of which the base is turned apwards and backwards, and is confounded with the corresponding auriele; it has more extent on the autorior surface of the heart than on the Open this ventricle on its anterior surface about an inch below the origin of the pulmonary artory, introducing the fingers of the left hand, and continue the incisions through the walls of the centricle, so as to do the least injury possible to the tleshy columns and tendinous chords, which are felt in the interior of the ventriele. Its anterior and outer wall is rather thin and very enneave. The posterior and inner is formed by a septum, which equally belongs to the left ventriele: their thickness is unequal in the different parts of their extent; both are pretty smooth towards their base; but in the rest of their extent, they present a great number of nuscular bundles, (Columna carnea,) which vary much as to size, length, and direction; their disposition is in general rather irregular, some directing themselves vertically from the summit to the base, while the others cross them in all directions, and form with them a confused net-work. Of these columns, from three to eight or nine, are much larger than the others; they are rounded, and differ so much in length, that some of them resemble more tubercles, while others have an extent of nearly an inch. All arise from some point of the walls of the ventricle, direct themselves, becoming larger, from its summit towards its base, and terminate abruptly, each by several small tendons. (charder tendineer) which are inserted into the points of the tricuspid valve, diverging sensibly from, and sometimes anastomosing, as it were, with each other. Some of these tendons are hifureated, and most of them enlarged at their termination. Other fleshy columns of the right ventricle, more numerous than the preceding, are attached to its walls by their two extremities, but are free in their circumference. Others again are attached to the walls in their whole extent, and in the manner of pilasters. These are the most numerous and the thinnest. They pass in all directions, and are interlaced with each other, so as to represent a net-work, leaving between them depressions, differing in form and

characters. The base of the right ventriels is perforand by two americans. One of these, the Hight Auriculturestricular Or fice, which is situated posteriorly, is exparated from the other by an interval of about an sinck communicates with the auricle, and is farmished with a membrane one feld, named the Trimegod cales. One of the surfaces of this valvo is turned towards the walls of the yentricle, and the other towards the cavity of the auxilia; its adherent edge is attached to the circumference of the orifice, and surrounds it without interruption; its free edge is connected with the chords tendines; it is very irregular, and presents variable intersections, among which, however, there are always remarked three of larger size than the rest. One of these, which is triangular, fouger and breader than the others, and directed upwards and forwards, exactly closes, when laid down, the entrance of the pulmonary artery. This valve, which is thin and transparent in its whole extent, becomes decidedly thicker at its free edge, for the attachment of the small tending, of which we have spoken. The other operture of the base of the ventricle is of smaller size than the preceding, and leads to the pulmonary artery.

c. The PULMONARY ARTURY, (Art. Pulmonaris). carries into the lungs the blood to be submitted to the action of respiration, arises from the upper and left part of the right ventricle, within which its prifice is surrounded by a cartiloginous ring, marking the limit of the fleshy filters of the heart; but, externally, these fibres descend upon the artery, over an extent of about half a line. In this orifice are the Sigmoid or Semilunor Folius, these membraneous folds adhering to the artery by their whole convex and inferior surface, and presenting above a free, horizontal, and straight edge, on the middle of which there is a small prominent tobarele, of a films-carrilaginous consistence (corpuscufrom drantis). They are in contact at their extremities, and are thin and transparent. When let down, they completely close the artery, and prevent the blood which it contains from returning into the ventriels. To expose these solves, and likewise the auterior of the arters, the student has only to continue the incision be previously made into the ventricle, upwards through

the walls of the artery as high as its division. The pulmonary artery directs itself obliquely upwards and to the left, grassing the course of the aerta, unterior to which it is placed first, and to which it is united by an adipase colledar tissue. It then plants itself to the left of the mura, and at the end of a course of two inches, at the height of the account dorsal vertebra, it divides into two trunks, one for each lung. These trunks acparate from each other almost tragsversely, and at the point of separation there are ads from the pulmonary artery to be attached to the concave side of the north. a rounded cond of cellular tissue. This is the remains of the doctor arterious or ascending middle branch of the pulmonary attery in the fotus, by which branch the bland in the feetns is diverted from passing into the langs, but being transmitted directly into the norta is thus sent through the body. The left recurrent nerve (servas laryagraz inferior) a branch of the eighth pair, will be found passing around the arch of the norta, close to the left side of the ligamentum arteriosum. The right pulmonary trunk, which is longer and smaller than the left, passes transversely behind the norta and vena cava superior, forms an arch which embraces anteriorly the corresponding branchus (282); reaches the lung, towards the upper part of the root of the lungs, and divides into three principal branches, The left palmonary branch passes obliquely before the north and below its arch, embraces the bronchus of its side, and enters the opper part of the root of the lung, divides into two branches only, one for each lobe of the lung. Once entered into the langs, the first divisions and the successive ramifications of the pulmonary artery accompany the brought to their last extremities, multiplying like them, so that there is no part of the organ however small which does not receive twigs from them. At their termination these minute twigs are supposed to mastumose with the roots of the pulmonary voice, and with the broughial arteries and veins. The pulmonary artery has the same structure as the aorta, but its walls are weater, and a partly collapses when empty.

D. The PULMONARY VERM (Fence Pulmonarce) are supposed to arise from the extremities of the pulmonary arteries, and are collected into small (wigs and branches, becoming snearssively larger, which accompany the divisions of the broughi and those of the arteries, it being observed that in general the venous twig is placed beneath, and the arterial above, the bronchial twiglength all the branches of the pulmonary veins unite into four trunks which leave each lung, two and two, at the middle of its internal surface, and penetrate into the pericardium. The superior right pulmovary sein emerges under the bronchus, directs itself obliquely downwards, and opens into the upper and right part of the left auricle of the heart. The inferior comes from the lower tobe of the lung, and ascends obliquely towards the inferior and right part of the same auricle. They are both difficult to be exposed, being concealed by the vena cava superior and the neighbouring part of the right anriele. The two left pulmonary veins follow a similar course, and are merely a little nearer each other. The pulmonary veins have the same structure as the other veins of the body, from which they differ in the circumstance that during life they contain red blood, A few fieshy fibres may be seen on their outer sarface derived from the left auricle. These veins are easily found, seeing that their orifices terminate in the left nuriele.

L. The LEFT AURICLE, (Auricula Simisten a, Saperior.) Situated at the upper, posterior, and left part of the heart, is almost entirely concealed by the great vessels of the base of that organ, so that, at first sight, there is nothing perceived but its appendage (proper auricle), near the left side of the pulmonary artery. Its form is somewhat cubical, while that of the right auricle may be in some measure emapared to a segment of an avoid. Its capacity is about a fifth less than that of the latter. Proferiorly, it rests upon the vertebral column from which it is separated by the peeleardium; auteriorly and internally it is united to the rest of the heart. From its inner and upper part there is seen rising an appendage similar to that of the right anricle, but smaller and directed to the right; its edges are equally jagged, but its form is triangular. It may be laid upon and its interior examined by an incision commencing in the proper nuricle and extending through the whole of the division called sinus remans. Its inner. I'. The paderior which is smooth, receiving the right pulmonary veins above. The noterior presents, below, a wide aperture leading into the left centricle, and, above, the cavity of the appendage, containing much fewer much is perturned than that of the right appendage. The right is amount and formed by the inter-auricular septum, (279, a.). There is here a semilurar valve forming the bottom of the fossa ovalis.

4". The left is perforated by the two corresponding pulmonary veins, the orifices of which are very near

each other, and even sometimes joined.

E. The LEFT VENTRICLE (Fentriculus Siminter 8. Postgrior) a little narrower, but longer than the right, and thus forms the spex of the organ. Its form is that of a pyramid a little flattened; but, as its walls are very thick, it never presents the same falling in as the opposite ventricle. It should be laid open much in the same way as the right, by making an incision into its fleshy walls sufficient to allow the introduction of a finger or two, and cutting cautiously on these, avoiding any incisions into the mitral valve. Internally, there are columnae carnese similar to those of the right ventricle, but less numerous and less irregularly disposed. Two of these fleshy bundles, which are larger than the others, and free at their circumference, arise, the one before, the other behind, and a little beneath the middle part of the walls of the ventriels, by several distinct and smaller bundles, ascend obliquely towards the base of the heart, and terminate by a rounded or bifurcated extremity. from the summit of which proceed a multitude of very slender divergent tendons, frequently crossing each other, which attach themselves to the free edge of the mitral valve. In the base of the left ventricle there are two apertures. One of those, the Left Anricalo ventricular Orifice, which is posterior and larger, leads into the auriele, and is nearly elliptical. Like that of the right side, it is surrounded with a cartilaginous zone, and furnished with a membraneous fold, called the Mitral Valve, because its free silge is divided into two slips, to which are attached the chardre tendinen; one of these slim is applied upon the mouth of the norta, which it almost entirely closes when the ventricle is dilated.

This valve is thicker than the tricuspid valve, and frequently contains small hard fibre-eartilaginous tubercles, and sometimes even bony plates. The salest aperture to the right and noteriorly of the latter leads into the north, here there are three Newillanar Fulers, similar to those at the entrance of the pulmonary arrevy. Above their free edge the prifices of the two coronary arteries of the beart are seen. This orifice of the north is sortunaled with a cartilaginous ring, forming the true boundary between the tissue of the heart and that of the artery. Outside the sensitionar valves, the walls of the north are dilated, forming these prominences (Ni-

muses of Valsalea's at the enterior.

o. ORGANIZATION OF THE HEART, 1". Muscular Tissue of the Auricles. The walls of the nurieless are much thinner than those of the ventricles. Right Auricle, the museular tlame constitutes a pretty thick layer of longitudinal fibres towards the point of union of the two verse cayse, where it is separated from the scrous lamina of the pericardism by a considerable quantity of fat. In the rest of the pursele, this tissue only presents itself in the form of thin bundles eroming each other, in the intervals of which the serous lamina of the pericardium is in immediate contact with the inner membrane of the cavity. These bundles, although smaller, are more numerous in the appendage. One of them sarrounds the ordice of the year cava superior in a circular manner. The disposition which we have just pointed out causes a part of the right auricle to appear transparent. In the Left Auricle, the deshy layer is much thicker and more uniform than in the right; the museular fibres seem to come from the pulmonary veins, on which they begin to appear by parallel bundles when these vessels issue from the langs; on the suriele itself, they retain their original direction at the surface. and form a transverse plane; but more deeply, they orner each other irregularly, without however being disposed in isolated busiles as in the right unricle. Between the two aurieles, the muscular tissue forms a thicker and more uniform layer, from which results the inter-surroular regium. 21. Muscular Tirene of the Festivales. The walls of the right scotricts are rather thin ; a uniform fleshy layer favour it enternally ; more dauply, the manualir tissue collects into bundles disposed like those of the aurinles, but stronger and pairs. numerous; several of those, detached from the walls of the envity, give rim to the columns carnon. The Left Ventricle has much thicker walls than the right, its ouperficual fibres were directed langiculinally from the base to the summit; the middle fibres are intermingled in an inextricable number; the deeper contribute to the formation of the columns carness 3. In the arptum, the muscular fibres of the right sentricle are interlaced with those of the left forming very again angles. They may be separated, however, so as to divide the heart into two portions, the one right and the other left. 45. The moscular fibres of the heart are extremely numerous and very close upon each other; their red calour is less florid and darker than that of the muscles of focomotion; their direction is very difficult to be determined they intermingle with each other, without any edbular tissue being interposed, as happens in the other muscles, to form distinct bondles. But although not distinctly arranged in fascinuli, there is a sufficiency of very fine cellular tissue amongst the fibres generally. They are fleshy in their whole length, the internal columnas alone being terminated by tendoms. 5". Membrune of the Right Conties of the Heart. This is notdently continuous with the monderage which lives the youngle doutiesed for the circulation of the black blood. On leaving the years gave it lines the whole extent of the auricle, being applied upon the muscular bundles, and, in their intervals, against the arrows luming of the preseardings, to which it is united by a dense but spars: cellular tisane. Beneath the sona cava interior it is folded upon itself to form the Eustachian valve, and afterwards that of the coronary sein of the heart. At the circumsference of the auriculo-ventricular orifice, it is separated from the muscular tissue by a layer of them and semi-fluid fat, which constitutes the white zone of which we have spoken. There also, it is folded upon itself, on leaving the unils of the organ, to give rise to the triempid valves; after which it lines the whole ventricle, becoming examinely thin, introduces had into the pulmonary artery, furner at its origin the three semilener valves, and is continued to the last ramifications

of that sessel. 6" Mountrans of the Left Carities of the Heart. It forms part of that which lines the walls of the vessels that earry red blood. It commences at the extremities of the pulmonary veins, lines them in their whole extent, and the whole cavity of the anviele without presenting any fold, and prostrates into the ventricle. At the entrance of the latter, its thickness increases a little, and it is folded upon itself to form the mitral valves, but afterwards becomes very thin. It leaves that part to proceed into the acrea, and from thence into all the arteries of the body. It is of it that the three semilunar valves are formed, which are found in that vessel near its origin. The arteries of the heart are two in number, rising immediately from the north, and called Corowary. The enronary vein enters the right auricle. The orifices of the veins of Thebesius are seen in the interior of the heart, but these have not been very satisfactorily demonstrated. The enganary veius of the heart have valves, but they are rudimentary and very imperfect. Its lymphatics are numerous, go to the lymphotic glands situated before the arch of the norts and left broughus. Its nerves are numerous, and come from the cardiac lymphatic glands. The ceruline wereve are small with reference to the size of the organ; they come from two sources; 1st. From the cervical ganglions of the sympathetic; 2d, The cardiac filaments of the pueumo-gastric. Lastly, a portion of the serous lamina of the pericardium may be considered as entering into the enumeration of the heart, the outer surface of it being invested by it in its whole extent.*

^{*} Some farther remarks respecting this important argue may be useful to the strainers. Values. A healthy licert should, according to Lucinare, he about the size of a closed fast of the indicational, and this, though a coarse approximation, is tolerably just. If enlarged by distration, the discuss is called surviving if enlarged by thicknessing it is called hypertrophy; if much dimensioned it is said to be atrophied. Weight. The medium weight of the empty heart is from seven to eight ounces; the atrophied may occasionally neigh twenty-two nunces. Moreovernous. The height or length of the controller measured automatic is about their lines; but posteriorly only two inches three lines. Its conomicronics at the base when moderately injected, is about ten inches. Florus Zene of the Heart. These stores.

280. The Adara. The student is now prepared to trace the pourse of the north through the thest; at its origin from the left ventricle of the heart, it is covered

are four as sometime 12. Auricula vocaricular, 25. Arterial, Each surremovement realer gume is a kind of girds surrounding the urifics of communication between the suricles and ventricles. It is a very penduar structure, but was well understood by the most atcome and emists. In the left atminute-ventricular some in opprain of the lower animals, there is frequently a bone developed, as in the on, deer. for, but not in the horse. Gales know these faces perfectly, and his successors ventured to apply them to the anatomy of the human heart, but in this they committed a great The presence of the bose in the auricula-ventricular zone of the beart in runningting animals is a specific structure and not a pathological phenomeron as M. Cravillius supposed. It is present in the calf, farm, &c.; as it is absent in the barre, it is crident that its presence or absence is not caused by any necessity for strengthening the part in the larger animals, else it would be present in all. To return to the human auricule-ventucular zones; from each of the circles they form, there proceeds an expansion of the same nature occupying the thickness of the tricuspid and mitral vaives, and into these fibrony rireles proceed direstly or indirectly most of the cords tending of the rentricles.

2. Aronal Zone. These are also two farons circles somewhat less than the orifice of the arteries which they surround at their junction with the heart. From these runs proceed, 1. Three very that but strong prolongations filling the angular innervals of the festcone which the norm and pulmounly arteries have at their urigins. 2. Three other prolongations to the signal values of these wessels. The preservor half of the arring circle is intrinsitely united to both uniteally ventricular zones. All these parts may readily be seen by laying open the orifices of the

creat actiones at their connexion with the heart-

It is difficult to describe to the elementary student the course of the innecessor fiber of the heart. The only way perhaps to understand these is, to follow the fibres layer by layer upon the car's heart, which has been builed for several hours. The following statement has been given by M. Crustlilier is an approximation to the truth. The heart is formed of two matrices once.

contained in a third, commun to both pratricire.

All the muscular fibres of the heart state from the fibrous space, and all terminate in these zones. The mascular factivals are of great length ascending and descending; they are disposed in successive layers, and the fibres cross each other at right angles; they may also be decided into common and proper. All the superficial fibres are common to both ventricles; they are oldings and spiral towards the point.

The cause of the sounds of the heart has been much disputed;

it is a purely physiological question.

for a couniderable extent by the pulmonary artery; it ascends obliquely forwards; and to the right side to a level with the cartilage of the second rib | appears to about the menus dorsal vertebra is leaves the pericardium, and shortly after proceeds transversely backwards; it next descends until about a local with the fourth dorsal vertebra, from which point it follows, pohas been already described, the course of the vertebral column but rather towards the left side. The portion of the north from its commencement to the level of the fourth dorsal vertebra, is called the urch of the north, and is subdivided into these partions; vis. 15, an ascending; 25, transverse; and 37, a descending portions The first portion is the loopest, and can be best mon by outting away the polinimary artery and carefully eleaning the north. It has chartly within the pavicardium and is mostly covered by the errors layer of that mous-It is here that the sorta is very hable to ulceration and consequent rupture and sudden death. gaussed by the filling of the pericardium with blood. In this position, along the student will observe its greater orbitre than the other purzs; the orifices of the ensurery arteries the sinuses of Valsalyn or Morgagni lying naturior to the semilmost valves. The 2d, or transcerse portion of the arch is chiefly oxternal to the pericaclism and above it, and in front of the trucken, it gives origin to the arrests bracking ceptulies, the left common caretid and left subclavian arieries; if another artery be found arising from this part of the arch, it will usually happen to be the left verselieral. The Sd, or descending porcion of the erch. la remarkable for occasionally presenting a slight contraction, and it is here that the sorts has been known to become spenteneously obliterated. To the commanagement of this portion, but on its concave alde, the ligamentum afternamm is aroually attacked. ing through below the arch of the aorts, the student will lied the right branch of the pulmonary artery, the left broading, and the left recurrent server. For a more particular account of the branches of the gorta, the annious aboutd at this stage of the discretism comvoit the secount of the vareular system.

201. The Livies (Fulsiones) are two spongy, rellu-

lar, expansible organs, contained within the cavity of the thorax, reparated from each other by the medicatine and the heart, partially surrounded by the plaus rae, they are the essential organs of constration. Although the lungs are to appearance separate and distinet, they are yet really connected with each other, since they receive the air by a single canal, and as the blood is transmitted to them by a single vestel. Their volume is not round however, but on account of the projection of the diaphrapm on the right side caused by the liver, and the obliquity of the mediastinum to the left, the right lung is thinker than the left, which in its turn has a greater vertical extent; the left lung is almu little smaller than the right. The volume of the lungs is exactly proportioned to the expacity of the eavity of the thorax. They follow the motions impresent upon its walls, against which they are always applied, and dilate and contrast like them; nor does any vanualty over exist during his between that part of the plears which govers the large and that port seventing the walls of the chest, It is here, however, a coin the m named cavity of the pleace, that water sometimes accumulates, forming the hydro-thorax; and puralent matter, forming the disease ralled empyema, and sometimes even air, as in the phoumo-thoras; but all these are diseased conditions of the organs. The lungs are proportionally much lighter than the other organs; they never sink in water so long as they are in their natural state, and this lightness depends upon the air which penetrates their whole thoug. In influte which have never breathest, the lungs generally sink in outer. But the absolute weight of the lungs rariomuch in different individuals in which they are examined, which may depend upon the greater or loss quantity of blood that remains in those at the tooment of death, or upon a larger development. It is also to be observed, that in children which have me breathed, the lungs are, with respect to the total weight of the body, in the variable relation of 55, or 70 to 1: whereas the proportion is as 28, or 35 to I, when respiration has taken place. The act of respiration, therefore, diminishes their gravity in a great degree, a circumstance which it is of importance

to know with reference to medical jurisprudence. The colour of the lungs in the healthy and adult state, is a pale yellowish red, more or less approaching to white or grey. The younger the subject the lungs will be the redder. This tint is equally observed in the interior, and at the exterior of the organ. But if the bland happen to be too much accumulated in its parenchyma, the colour is a dark rod or purple, uniformly diffused, or only dispersed in patches, which produces a marbled appearance. It is for this reason that the lungs are always more exhoused on the side on which a dead body has lain. The reddish, or greyish colour of the lungs, is interrupted by small black and brown spots, irregularly dispersed at their surface, and more or less numerous; they are exactly defined, and in general affect a linear form; they are soldom isolated from each other; some are entirely superficial others penetrate more or less deeply. into the tissue of the lungs, and there are some which seem limited to the pleura or membrane which immediately envelopes these organs, in the substance of which they also occur. Buisson considers them as analogous to the lymphatic glands of the brought. Of the solid organs of the body, the longs are those which have the smallest density; they may be compressed with the greatest ease, and only resume their original state imperfectly; although flexible and soft, however, they have a tissue which is not easily torn. The form of the lungs is not very easy to be described. It may, however, in a peneral manner, he likened to that of a cone, having its base directed downwards, and its summit upwards, and flattened internally. The right lung is divided into three unequal lober, by two oblique fissures; the left presents only a single tissure, and consequently has but two lobes. Their outer surface, which is convex, especially behind, and nearly plain anteriorly, is free in its whole extent, and corresponds to the walls of the thorax, from which it is separated by the costal layer of the pleurie. It is smooth and polished, and constantly bedewed with a serous fluid. On the left lung, it presents a fiscure which descends obliquely from the pesterior to the anterior edge, and divides the organ into two lobes, a superior and anterior, which is smaller, and a posterior and inferior which is larger:

this fissure nearly penetrates through the whole thickness of the organ. A similar fissure is observed on the right long; but in it the upper lobe is divided into two portions by a secondary fissure running obliquely downwards and outwards, and consequently in a direction the reverse of the great fissure, and which varies much as to depth and extent. In the two lungs, the upper lobes, which are large above, terminate below in a point, while the contrary takes place in the lower lobes, which are always larger. In the right lung, the middle labe is triangular, presenting its summit outwards, and its base inwards, and is smaller than the other two. The internal surface (roots of the lungs) of the lungs, which is plain or slightly concave, to accommodate itself to the shape of the heart, corresponds, posteriorly, to the mediastinum, and the vertebral calumn. About the middle of its height is seen the insertion of the brenchi and pulmonary vessels. Its two anterior thirds are contiguous to the pericardium and thymus gland. Anteriorly to the roots, he the phrenic nerves, and a few filaments of the eighth pair; posteriorly, the pulmonary plexus of the same pair of norvey. The dissection of the roots of the lungs a little anteriorly or posteriorly, consists merely in stripning off the plears and removing a little cellular substance; when this has been done, the branch of the pulmanary artery proceeding to each lung, will be found superiorly and posteriorly; the pulmonary veins below, but anteriorly the broughts! tubes lie superior. to these, more especially the right one. The anterior edge of the lungs is thin, sharp, especially below, oblique, sinous, more or less moeyen, directed obliquely downwards and forwards, and notehed on the left side only, to receive the point of the heart. Their puterior edge is thick, rounded, murly vertical, and lodged in a groove which the ribs form on the sides of the vertebrnt column. Their base, which is slightly concave, rests upon the upper surface of the diaphragm, and is inclined a little downwards, and outward on each side. It is circumscribed by a sharp and sinuous edge, which is ludged between the riles and the insertions of the displiragm, and on which there occurs the end of the interlobular fissure. Lastly, their summed, which is

narrow, obteso, and a little bulged, is situated generally in the anek, a little above the level of the autoriapart of the first rib. Organization of the Longs. The tiesne of the lungs is very complicated. It amos exchtially composed of prolongations and sucremive runtfications of the brunels, and pulmonary arterio and veins, which nick together in all their divisions, and are sustained by a very fine collolar timue, so as to constitute a series of labular which are covered and united by the plante, and laterspersed with nerver, vessels, and iverplatic glands. Itomicson thought that the bronehial tulos terminais in air cells. Proper Tireur of the Lunga. We have almody to a certain. degree, an idea of the lutimate structure of the lung, so we know several of the organs which enter into its composition. Has when we come to consider it with some attention, without reference to its constituent parts, we find that it is divided into anyeral lobules distinet even at the exterior, and separated from each other by small whitish prooved. They are sepecially very well seen on tearing the tissue of the organ after it has been builted. They wary much as to volume and form. They present, in general, a number of small surfaces, bounded by prominent angles, and present in their intervals a lause, illamentous cellular risons, destitute of fat, very extensible, and capable of becoming omphysematous with the greatest case, whether during life, by the repoure of a division of the lampehus, or after death, by insuffiction. Each of the tobules is divided into smaller, without its being possible to thiscover the precise termination of this division. The intimum atructure of these but bolides in unknown. Willis asserted that they have a racemiform perangement around the ramification of the brought, which, however, does not appear to be the case. It is only very probable that they are formed by the union of the last extremities of the brunchi, vounds and nerves which are distributed in the lange. At this store of the dissection the student should get permation from these who may be disserting the neek, to examine the anatomy of the tracker throughout its whole course. Let him first remove the great blood-versels placed over its lower part, and clean it corefully downwards to its division

into the brought; discret these carefully inwards each long, preserving as well to be can the broughtal glands, the broughtal arteries, and pulmanary plotter and serves.

282. The Tunches (Aspera Arteria, windpipe), is a evidentical, cartilegeness and membraneous tube, a little thursand posterorly, placed before the vertebral column, extending from the lower part of the larynx to opposite the seroud or third-ineral certebra, in the posterior mediastinum. Hunning along the median line of the body, symmetrical and regular in its whole extent, slightly mobile and extensible, the trackes has a uniform diameter of about eight or ten lines, which varies only seconding to the age and certain individual peculiarities. The numerine pair of the tracken is convex, and covered above by the theyenid gland, inferior thyroid reins, and storm-hymder and sterm-thyroidei namelies, from which it is separated by a layer of lome cellular tissue, interiorly, it corresponds to the thymns gland, the left vena mamminata, the arteria innuminata, and the arch of the aurto; its posterior aide is flattened. covers the desoplayer, and a little to the right, the bodies of the vertebra, which is owing to the obliquity of the resonages; belently, it is contiguous to the common parutal arieries, the internal jugular veins, the paganan-gastric perves, and the communicating twigs of the cervical ganglia, which are separated from it by a man of pollunes cellular tissue. Inferiorly the trachen hidureates, dividing into the two Remehi, which are distinguished into right and left, and which separate from each other, directing themselves downwards and outwards, at morely a right angle. The High Branchus is wider, shocker, and more harizontal than the left, and in a little autoriar to it. It penetrates into the lung upposite the fourth dorsal sertdent, is embraced in its nourse by the curve of the vent atygos, and by the arch which the right branch of the pulsionary artery forms. The Left Browchus, which is a little smaller, but longer and more oblique, is embraced by the oorta and left branch of the pulmonary artery. The bronchi enter the lungs by their internal surface, and divide into two branches, which, after a very short emane; subdivide, and thus give out branches becoming gradually smaller, which take all kinds of directions. These ramifications seem to divide the whole tissue of the organ into lobules separated from each other by cellular tissue, and absolutely exist in all points. It is extremely difficult to trace them to their termination. Malpighi thought that they end by rounded and membraneous vesicles, which, are ording to Willis, are pedicellate. Senae imagines the lobules of the longs to be composed of polyhedral vesicles, the sixth of a line in diameter, into each of which a twig of the bronchi opens. But it appears demonstrated, on the contrary, that the divisions of the bronchi ultimately terminate by a small undilated culsile sue, and that it is from the union of several of these minute twigs, kept together by the cellular tissue in which they are immersed, that

what is called the Polymonory Labule results.

283. Organization of the Trachea and Brox-CHI; composed of I', cartilaginous rings; 2', membranes; 3°, arterial and renous vessels; 4°. lymphatics; 5", nerves : 6°, muonus follicles : 7°. Branchial Glands. 1°. The Cartilagianus Rings are from sixteen to twenty in number; they are not complete rings in man, being interrupted in their posterior third. are placed horizontally above each other, and separated by narrow membraneous intervals; purved upon themselves, and flattened in the plane of their direction, they have all the same length, but vary as to breadth; their form approaches that of a very clongated right-angled triangle, when they are stretched out; they are commonly thicker at their middle part than at their extremities, which are sometimes bifurcated. By their convex surface, they correspond to a fibrous membrahe. and by the concave are in connexion with a mucous membrane; their rounded edges give attachment to the first of these membranes, and project a little more on the inner than on the outer surface of the canal; sometimes also several of them are seen to units. The first is commonly very broad, and sometimes joins the cricold cartilage; the last is still broader, and very different from the others ; it is triangular, and its middle part is prolonged inferiorly, bending a little backwards, to accommodate itself to the origin of the bronchi. In the first ramifications of the bronchi, the cartilaginous

rings are entirely similar to those of the tracing, only thinner, smaller, and sometimes formed of several pieces; but in the secondary ramifications they are merely small irregular grains, varying in form, united or separate, which gradually diminish, on as to disapprar entirely in the ultimate divisions of these canals. The colour and consistence of the cartilages of the trachea and brought are the same as in those of the ear. the apertures of the nose, &c. Their elasticity is very remarkable. They seldom ossify, even in the most advanced old age. 22. The Fibrana or Outer Membrane comes from the inferior circumference of the cricoid cartilage, and is prolonged to the last extremities of the bronchi, becoming gradually thinner to an excessive degree; it is formed of longitudinal and parallel fibres, of which the more superficial are reddish, the deeper white. This membrane alone forms posteriorly the solid portion of the traches, which gives that canal a square form in this place: Anteriorly it is continually interrupted by the cartilaginous rings which appear developed in its substance, and it only sends before them a very small number of fibres; externally and behind we observe granules, varying in figure, named mucous follieles; their excretory duets traverse the whole substance of the canal to open upon its inner surface. Intermilly, and in the intervals of the cartilages, to the mucous membrane, from which it is separated by a multitude of other smaller granulations, varying in colour, which also appear to be follicles. But posteriorly, it is immediately applied upon the muscular layer, attucked to the extremities of the rings, composed of fibres, passing transversely from one cartilage to another, but, contrary to the assertion of Andral and others, forming a uniform layer between the mucous and fibrous membranes. This muscular layer is best dissected from the inside. These fibres are disposed in small foundles, and form a perfectly distinct plane. The Macous or Inner Membrane is a continuation of the membrane of the larynx, and extends to the termination of the brought. Thin, reddish, and plicate in the direction of its length, especially at the back part, where it is applied against the filtres of museular appearance which we have just noticed, it corresponds in the rest

of its extent, to the inner surface of the cartiloginous rings, and, between them, to the fibrous membrane. It has in general little adhesion to these different pures. Its inner surface is perforated by the excretary orinies of its mucous follieles, which constantly pour out a rather thick and not very plentiful fluid. Its organization presents nothing remarkable. To examine it, the trachea must be cut open longitudinally and anteriorly from near its communecement, quite to its division into the bronchi, and these also should be faid open in the same direction. 3º. The years of the trackén come from the superior and inferior thyroid. Its nerves are furnished by the pneumo-gastric negoes, and revolval ganglia. The bronchi have actories which hear their name, and which arise immediately from the north; they are commonly two in number, a right and a left-They have corresponding veins, which empty their contents, to the right into the vena arvgos, and to the left into the superior intercostal vein. Their nerves are supplied by the two pulmonary plexages. 4. The Lymphatic Glands are very numerous, and are situated before the bifurcation of the traches, around the branchi, and even in the interior of the lungs, where they are irregularly disseminated. Their form presents numerous variations, being sometimes usal, as rounded, sometimes labular, and varying much as to size; the larger are lodged above the tracken, the smaller in the intervals of the brought. Their colour is black, or of a dark brown in the adult, reddish in children. Their tissue has in general little consistence; when crushed under the fingers, they stafe them deeply. When out directly across the traches remains always open.

284. The Triviers is an organ whose uses are unhnown. Its description, however, naturally enough, comes to be considered in this place. No exerctory dust has ever been discovered. In the folios this organ extends nearly from the thyroid body to the vicinity of the disphragm, and thes occupies the preserver part of the anterior mediastinum. Gradually diminishing with age, whilst the other textures increase, it can scarcedly be seen in the mink. Hebrid it are situated the traches, the great blood-coursels, and the perfections of hefors it the manufacture of the sternum and lawer part of the demo-thyreidei mandon by its edges it touches the plourse below. It is notched and grooved anteriarly. A thin collabor capsule proceeds into its interior, separating it into labular, and them again show voicles filled with a milky and slightly viscous fluid; these cavities areas to communicate with each other. Its actories arise from the inferior thyroid, internal mannancy, brone bink mediastinal, and perseardize arearies, and are partly numerous, that is in the young peraon, before the age of ten or twolve. A few acryum filaments process to it from the eightli pair, the physics

and inferior servical ganglia.

285. The Œsoru agus, although properly belanging to the digestive organs, will be best described in this place. It is a municulo-coordinatorus canal, extending from the lower part of the pharyex to the cardiac or superior arifice of the stomach. It commences opposite to the fifth corvient vertebra (at the look part of the cricoul cartilage, which may be felt in the living body), and terminates between the crura of the displiragin, and conorquently in the abdomen. At first it is mesial, but gradually inclines to the left side, a little lower downs but in entering the thorax, it becomes again mental about the upper and back part of the brought, and continues so ustil it leaves the thorax. Whilst passing into the abdomen, it nore more inclines a little in the left, and terminates in the stomach. A loose redular tissue emmeets it to the surrounding parts; excepting where covered by peritaneum, it is very firmly fixed in the displaragm; this cellular tissue contains some lymphotic glands. The gullet may be subdivided, for the sake of its more careful examination. into two portions, viz. a regular and thoronic; the third portion, or abdominal, being too short to merit attention in this way. The ceruical parties has antemorly, to a certain extent, the lower part of the laryax, the left half of the trachen, the left inferior thyroid vessels, and the stereo-thyroidel muscles; posteriorly, the great opterior revieteral ligament, and the left longus colli muscle: laterally, at first, to the common encetid arteries and internal jugular veins; and afterwards, on the right side to the trackes, and on the left, to the recurrent nerve and enroted artery of that

side. In the thoracle partian, the gullet is entirely contained within the posterior mediastinum; in front, it touches the trackes and left brouchus, the posterior part of the pericurdium; posteriorly, it touches the vertebral column, the curve of the vena azygos, the thurneic duct, and at its lower part the aorta. In diameter, it is somewhat less than an inch. It is composed, according to some, of two tunies; according to others, of four. The indisputable ones are the museular tunic, and the mucous or inner membrane; the two less certain are, the nervous or cellular, and the epidermis. To examine the gullst carefully, the student may remove two or three inches of its thoracic portion, and distend it with air, Imylag first secured it with ligatures. The muscular runic is external; there are two layers of fibres, viz. the longitudinal, which are seen first, and the circular, which can only be exposed by removing the others. They are well marked, the gallet being much more muscular than any other part of the digestive tube, excepting the rectum. The redness of the muscular fibres of the gullet diminish gradually as we descend towards the stomach. On the stomach the longitudinal fibres of the gullet expand and spread out in a remarkable way, but the circular fibres aoon censo. A layer of condensed cellular tissue his between the muscular tanic and the mucous tunic; this is analogous to the lamina nervosa, cellulosa, or vasculoss of the infestines. To see the mecons superbrane, it is proposury to lay open the gullet longitudinally; it is suft, spangy, delicate, continuous above with that of the pharyux, below with that of the stamach. Several longitudinal folds may be observed upon it, and mucros follieles (asophageal glands), which lie exterior to the membrane. Some believe that it is lined throughout, as far as the cardiac orifice of the stomach, with an epidermis. The arteries are not larger in the neck they come from the inferior thyroid arteries; in the thorax from the broughtsl, and directly from the north; in the abdomen, from the subdisphragmatic, and from the coronary of the sinmach. The veins terminate in the thyroid; the superior cava, the internal mammary, the vena azygos, the bronchial, plurenie, and coronary veins of the atomach. Its lymphatic vessels go to the adjoining glands; the nervesare farmished chiefly by the eighth pair, and their recurrent branches. These nerves form a plexus around it. By heading the head backwards, the student will find that a straight and unyielding instrument may be introduced from the mouth directly down to the stomach; in this position the gullet, mouth, and pharyux must be nearly in a straight line, as was proved by the Indian jugglers, who exhibited in this country a few years ago the very singular feat of passing a sword directly down into the stomach of a living person.

286. The Superior Origins of the Thurax presents many unatomical relations, important not only to the physician, but above all to the surgeon. Immediately above the manubrium of the sternum is the cervical fascia; beneath it the sterno-hyoid and sternothyroid muscles, ascending through the operture; behind these a quantity of cellular substance, and a little lower down the remains of the thymns; then the venue innominate, the right being short and straight in its course, the latter crossing over from the left to the right side, to join with the right, and thus form the venn cava superior, whose course through the pericardium, until it terminates in the right cavity, has been already described. The union of these two veins (vena-innominate) correspond to the cartilage of the second rib on the right side. Behind these veins, the phrenic nerves and par vagum enter the thorax, but anterior to the subclavian arteries, thus passing between the veins and arteries, the phrenic more external, the nervi vagi more internal. The course of the phrenic nerves to the diaphragm, between the pleura and pericardium, and anterior to the root of the lungs, has been already described; likewise the course of the nervi vagi behind the root of the lungs, and ultimately terminating in the stomach. Behind these veins and nerves lie the three great arteries arising from the norta, viz. 1st, the brachlo-cephalic or innominuta, more anteriorly than the others. 2d, The left common carotid. 3d, Deeper and farther back, the left subclavian. Behind these lie the traches, entering the thorax and its bronchi lower down; their, course and position have been already carefully described: so also has the guilet, which is found, behind the traches, vanishing the thorax close to the spoon. To the laft of this tabe to the situation we now advert to, will be found the upper part of the thoracic duct, ascending from the thorax to the neck between the laft carotid and subclavian arteries. On either side lie the recurrent nerves. External to this serve also, on each side will be found the sympathetic nerve; from its inferior cervical punglion, filaments pass in front and behind to each subclavian artery. Posterior to the gullet, the lungi colli muscles are next observed, also the anterior common ligament of the vertebras; and to the right and left, the superior intercental arteries, and anterior branch of the first pair of dono-spinal nerves. These ascend to join the axillary plexus.

PART VI.

DISSECTION OF THE INFERIOR EXTRE-

287. The muscles of the pelvian or lower extremity constitute not unfrequently the first part dissected by the student, and as the fore and upper part of the thigh contains much difficult dissection, and is in an especial way connected with the anatomy of the surgical disease called Crurst Hermia, the student ought uniformly to commonce his dissection on the back part of the launch and thigh.— The subject being placed upon its anterior

[•] Prayous in turning the uniques, the student should dissert with the greatest care the meaches on the bark of the thigh, take a surgical view of the populated space and the spansormes on the back of the log, a mather with the veins and superficial nervey. All this will sequent more than usual industry, as the parts on the

surface, and a block placed below the pelvis, detach by a series of incisions the integuments from the back of the hip and thigh, from the crest of the dium downwards, us far as the middle of the call of the leg. skin will be found the subcutaneous cellular substance or fascia, in which are several cutaneous nerves, branches of the Jembar, and some superficial veins. These veins run in different directions, and present in different subsects a good many varieties. First at the lower part on the calf of the leg will be found the upper portion of the posterior or short saphena voin. This vein ascends from the direction of the outer ancle and beel, enlighting the reins on both sides as it proceeds upwards, anastemosing with the long suphens velo. Having reached the popliteal space, (to be afterwards described,) or shortly before this, it plunges through the aponeurosis to min the populated win. On the back of the thigh will also be found several veins : of those, some wind round the land to join the long suphena, others pass deep at unne to join the deep branches of the perforating veins, and one mure conurkable than the others is sometimes found descending the limb, either to unite with the short suphena, or to pass separately is the nonliteal volu. I have seen this a remarkable vein in point of size. On removing the superficial fascia, there will next occur the

288. Francial on Chural Aronnuscus (posterior report.) This is sometimes called the Fascia lata Fasciaria, an extremely improper name: though as it were conscerned by antiquity, it ought to be laid uside. The femoral or crural apaneurosis, like that occurring is the superior extra nities, covers nearly the entire limb, extending from the crost of the ilium, quite down to the lact. The description of that part of the aponeurosis which the student has just dissected is as follows: The fascia lata, or femoral part of the crural aponeurosis is the strongest in the body. It is very dense posteriorly, and has origins from the sacrem and coccyx, and espe-

partners repetited for head and trink present few objects of interest, and are more over by the students angaged in examining those parts, and who, of course, domand the subject to be turned.

cially from the crest of the ilium. Where it covers the gluteus magnus it is thin, but anterior to this it is remarkably strong and inseparably united to the tendinous origin of the gluteus medius. In descending over the back of the thigh, it is remarkably strong and bound down, particularly to the outside, where it procoeds to be attached to the femur; internally unif superiorly it is continuous with the ligament of the symphysis pubis, with the periosteum of the scatic tubernsity, and with the ramus of the ischion and pubis. It is inserted into the whole length of the outer lip of the linea aspera of the femur, by a lamina firmly united to the vastus externus, ascending between it and the short portion of the biceps, and finally receives many fibres from the gluteus maximus. Inferiorly the aponeurosis is continued over the popliteal space to the leg ; is attached to the tuberosities of the tibia, and proceeding downwards, constitutes the aponeurosis of the log. Small filaments proceed from the aponeurosis to the skin, and many small ressels and nerves pass generally obliquely through it, carrying sheaths of cellular substance along with them. It is this circumstance which makes the aponeurosis sumewhat difficult of dissection, particularly in fat subjects. It envelopes in one shouth the flexor muscles on the back of the thigh, and also sends a prolongation beneath the deep surface of the gluteus magnus muscle. This will be best understand during the dissection of these muscles,

289. GLULEUS MAXIMUS.—Broad, thick, and quadrilateral. It especially forms the hip. Attached above by short aponeurotic fibres to the posterior part of the crest of the ileum; to the tuberosity of the ileum, and to the rough surface posterior to the superior curved line upon the outer surface of that bone; to the posterior sacro-iline ligament, on which it is continuous with the aponeurosis of the sacro-lumbalis and latissimus dorsi (lumbar fascia); in the middle, to the inequalities of the posterior surface of the sacrum, to the circumference of the notch which terminates the sacral canal, and to the lateral parts of the coccyx, as far as the summit of that bone; externally and inferiorly, to the posterior sacro-sciatio ligament. The fleshy fibres from these different places collect into distinct fasciculi, separates.

from one another by lines filled with collular tissue; all these fasticuli, which are parallel to each other, and longer the nearer they are to the lower part of the muscle, descend obliquely outwards and forwards, inwards the great trochanter; the upper fasticuli termimate at the upper part of a tenden, very thick and exrrow below, broad and thin above, and so incorporated externally with the fascin lata, as to be inseparable from it. This tendon, as it descends, receives the other fleshy fibres in succession along its posterior edge, from the level of the great trochanter, and is inserted, in an extent of three inches, into a rough impression, which proceeds from the base of the great trochunter to the limen aspera of the femur, and into the upper part of that line, between the adductor magnus and vastus extermus; proteriorly covered by a thin lamina of the fascia. lats, and connected with the skin by a layer of thick adigose (issue; auteriorly, applied upon the as innominature, the sacrum, the enceys, the common origin of the szero-lumbalis and longissimus dorst, the glutaux medius, pyriformis, geneili, obtuvator internus, and quadratus femoris muscles, the sciatic nerve, the tuber ischil, the posterior sacro-scintic ligament, the upper extremity of the biceps and somitendinosus, the great truckamer, and the addactor magnus and vastus externus muscles. Its upper edge thin, connected with the glutaux medius by a prolongation of the fascia lata : the lower edge long and free; the outer united in its whole extent to the fascia lata. The muscle has considetable analogy to the deltoid; on its external surface rests the singular custdon of stastic fat which characterizes some African nations, and more especially the Boschjiman race. De Blainville asserts that a similar cushion is found in the same race over the deltoides muscle, thus rendering the analogy still more striking. Remove the glotzus maximus by an incision carried across its centre, thus dividing it into two equal parts; reflect these cautiously, taking care not to cut away the great scratic ligament. The articulated privis, with its ligaments, should be placed before the student during the whole of this dissection. Between the glubeus maximus and the trochanter major will be found an extensive Synosial

Burso, expanded upon the outer surface of the trachanter, the neighbouring portion of the vastus externus, and the joner surface of the tendou of the gluterus maximus, the motions of which it facilitates. The gluteus maximus expands the thigh upon the pelvis, and the pelvis upon the thigh; it rotates the thigh outwards, and acts very powerfully in standing and pro-

gression.

290. GLUTZUS MEDIUS, broad, strong, radiated, triangular, thinner than the preceding, under which it is partly situated. It arises by short aponeurotic fibres from the outer surface of the as innominatum, between the two curved lines, from an aponeurotic arch which prevails along the inferior curved line, from the three anterior fourths of the iliac crest, and from the inner surface of the portion of the fascin lata which descends from the superior and anterior iliae spine. Preceeding from these different points, the fleshy fibres descend converging, and following different directions, the anterior, obliquely backwards; the middle, vertically; and posterior, obliquely forwards. They terminate upon the two surfaces of a broad aponeurosis, which is conrealed in their substance, and is longer posteriorly than anteriorly. This aponeurosis contracts and becomes thicker as it descends; it is left by the fleshy fibres towards the great trochanter, where it forms a tendon thinner before than behind, which is inserted into the upper edge of that eminence, prolonging itself a little upon its fore and outer part, and uniting with the gluteus minimus; externally, covered in its posterior half by the glutieus maximus, and in its anterior by the fascia lata; internally, applied upon the or innominatum, the glutous minimus muscle, and the glutcul artery. It slightly overlaps the pyriformis muscle. Its auterior edge is esomeciad above with the tensor vaging femoris, from which it is separated below by an interval, in which there occur a great quantity of cellular tissue and branches of the external circumflex artery. The peaferior edge is, at its oppor part, parallel to the pyriformia muscle, whose direction is crosses below, the glotes! artery and nerves lying between them. The two tendons are here separated by a synovial bursa. In action it draws the thigh outwards. By its anterior part, it

rotates the femur inwards, and in the contrary direction by the posterior part. It also acts in standing, and in progression. Its uses were particularly adverted to by Window, and Mr. Guthrie has explained by it how the toes are inverted in certain fractures of the femor. Detach the glutieus medius from the floum, and thus expose

291. The Georges Mexicon; smaller than the medius, and situated under it; flat, triangular, arising by short apaneurosis, from the inferior curved line of the os innominatum, and from the anterior region of its crest, beneath the glutaus medius, from the whole space comprised between these parts, nearly to the edge of the cotyloid cavity. Proceeding from thence, the fleshy fibres converge, and descend; the middle ones, vertically; the anterior and posterior, obliquely. The middle and posterior go to the inner surface of a broad aponearosis, whose outer part receives some hundles from the glatmus medius, which is accompanied by the anterior fibres of the glutaeus minimus, as far as the great trochauter, where it forms a strong and thick tendon, embracing the anterior region of that eminence. A small synovial capsule, in most cases, favours its motions; externally, covered by the preceding in the greater part of its extent, and a little, posteriorly, by the pyriformis; intersally, covering the os innominatum, the fibrous capsule of the hip joint, and the curved tendon of the rectus femoris. Its upper edge is convex; the anterior is a little connected below with the glamens medius; the porterior is covered above by the pyriformis, to which it is parallel below. Its uses are the same as those of the preceding muscle.

292. Pratronaits, of an elongated conical form, flattened from before backwards; situated in the polyis, and at the upper and back part of the thigh; its origin, therefore, can only be seen when the limb has been detached from the trunk; it arises by digitations from the anterior surface of the sacrum, to the outside of the anterior sacral holes, and in the spaces by which they are separated from each other; it is also attached to the lower part of the great sacro-sciatic ligament, and to the upper and back part of the ilcum. From thence it proceeds outwards, downwards, contracts, leaves the polyis by the sciatic notch, runs along the

glutaeus medius and glutaeus minimus, and terminates by a tendon, at first broad and concealed by the fleshy fibres and separated from the tendon of the gluttens medius by a synovial bursa, it is united by its lower edge with the tendon of the gemellus superior, and inserted, above the latter muscle, into the digital cavity of the great trochanter. Sametimes the pyriformis is split longitudinally, by the passage of the fibelar portion of the great sciatic nerve through it; this explains what the older writers mean by several pyriform muscles. I have never seen the ischintic nerve pass through this muscle, as is stated by some writers, and only once a small division of the small sciatic nerve. In the polvis, it lies on the sacrum; its anterior surface is covered by the rectum, the sciatic plexus, and hypograstric vessels. After leaving that eavity, it is applied upon the us innominatum, the capsule of the hip-joint, and the glutz-us minimus. Its poderior surfaceis rovered by the sacrum and the glutieus maximus. Upon the superior margin of the muscle will be found the glutcal artery, and vein, and nerves; below its inferior margin the ischiatic and pudic arteries, great seintic and smaller seintic and pudle nerves; it thus separates these important parts from each other. A great quantity of loose cellular substance surrounds all these parts, and investing them and the following muscles :-

293. Gruentus Scrumon, clongated, flattened, broader and thicker at its middle part than its extremities, arises from the outer lip of the scintic spine, proceeds transversely outwards, is confounded with the tenden of the obtarator internes, and inserted at the upper part of the inner surface of the great trochanter. Its posterior surface is covered by the scintic nerve and glutarus maximus; the outerior covers the as innominatum, and the capsule of the hip joint. It rotates the

thigh outwards, and draws it from the other.

294. Generally Interacts, has the same form, connexions, and uses as the preceding muscle; but is attached on the one hand to the upper and back part of the wher ischii, and, on the other, in the digital cavity of the great trochanter, above the obtorator externos. This is not unfrequently much larger than the genelins superior, which is cometimes altogether wanting, in

which case the inferior has double the usual breadth.

The two tendens of the gemelli unite behind that of the
obturator internus, so as to present a kind of groove for
it. To see these muscles properly, the jachintic arrayy
and great sciatic nerve must either be ant across or
fully drawn soids.

295. ORTURATOR INTERNUE, almost entirely situated within the pelvis, and therefore can only he seen properly when the limb, together with one side of the pelvis, has been detached from the trunk. It is flat and trinugular, and reflected upon itself as it leaves the pelvis, to propeed to the upper and posterior part of the thigh; arising from the posterior surface of the pubes, within and above the obturator hole, from the obturator ligament, excepting towards the aperture through which the obturator vessels and nerve pass, where it is connected with a small fibrous arch, and from the bony surface which separates the obturator hele from the scintic notch, immediately beneath the upper strait of the pelvis; the fleshy fibres converge, and descend to below the sciatic spine. But before they reach that point, four or five tendinous slips appear upon its outer surface, approach each other, and turn outwards over the edge of the small sciatic notch, as over a pulley, where they are lodged each in a small groove incrusted with cartilage; on emerging from the pelvis, these slips unite into a thick and flat tendon, which is horizontal, separated from the fleshy fibres, situated between the two genelli, connected with their tendens and inserted along with them, into the cavity of the trochanter, between the pyramidalis and obturator externus; extersally, applied within the pelvis against the os innominatum and obturator ligament. The extra pelvic portion is covered by the sciatic nerve and glutteus maximus upon its inner surface. The pelvic portion of the muscle is covered by the pelvic fascia, and partly by the levator ani muscle, whick, bowever, is not in contact with it, Where the obturator muscle turns over the sciatio notein, there is a synovial expeule, plentifully moistened, which covers the cartilage with which that noteh is incrusted, and is reflected over the slips of the tendou, and a little over the outer surface of the muscle, especially at its outer part. To see this bursa, the tendon

of the abturator must be cut through. It rotates the

thigh outwards, and abducts it.

296. QUADRATUS FEMORIS, situated transversely at the posterior and upper part of the thigh; thin, flat, and quadrilateral; arises, by pretty long aponeurotic fibres, from the outer side of the sciatic tuberosity before the semi-membranesus; proceeds horizontally, between the gemellus interior and adductor magnus, to the lower part of the posterior edge of the great trochanter, where it is inserted by aponeurosis. It crosses somewhat in its insertion the inter-trochanteric line, and occasionally looks much like a continuation of the addactor magnus, to which muscle it is analogous. Its posterior surface is covered by the sciatic nerve, and by the glotseus maximus, semi-membranesus, and adductor magnus muscles. The anterior covers the obturator externus, the extremity of the tenden of the paoas magnus, and the posterior part of the small trochanter, from which it is separated by a synovial burss. The superior margin runs parallel with the margin of the gemellus; the inferior is separated from the upper margin of the adductor magnus, by cellular tissue and some branches of the internal circumiles artery. Its uses are the same as those of the gemelli.

297. OBTURATOR EXTERNUS. On cutting through the quadratus femoris, the student will observe the tendon of the obturator externus; but this muscle cannot be dissected at this stage of the dissection, and will therefore be more fully described in the dissection of the deep anterior region of the thigh, to which it properly belongs; nevertheless, it is in some respects a capsular muscle of the hip joint, and may be arranged physiologically with the preceding muscles. During the preceding dissection, several vessels and nerves must have been remarked, and although many of their branches will by this time have been ent away, the

student may revise them advantageously,

A. The GLUYEAL ARYERY, the largest branch of the internal iline, leaves the pelvis by the upper part of the great sciatic notch, between the pyriforms and gluteun medius muscles, and soon divides into the following branches; a superficial and a deep branch. Mr. John Bell tied the gluteal artery in a case in which it had

been punctured; this splendid operation required great anatomical knowledge, and the greatest presence of utind, and deservedly placed Mr. Bell at the very head of the operating surgeons of his day. The branches of the gluteal artery supply the surrounding muscles.

n. The Iscarrate Arreay leaves the peivis below the inferior margin of the pyriformis, sometimes by itself, and sometimes as a common trunk, from which also the public artery may arise. This artery divides into three branches, viz. coccygoal, nervi comes ischia-

dici, and muscular branches.

c. The Courses Purse Arrany, (arteria pudeudo romagais), haves the pelvis at the same point with the isciatic, but is a little deeper, crosses the posterior surface of the spine of the ischion, and returns into the pelvis by the smaller scintic notch. It is accompanied in its course by the corresponding vein and nerve. The other arteries have also their corresponding veins, emptying themselves into the iliac veins. The pushe artery will be best traced while dissecting the pelvis. The nerves occurring during this dissection are.

b. The Cosmon Punit Nineva, of which a very small portion only can be seen; it comes from the sa-

eral plexits, and follows the course of the artery.

e. The Surgason General Neave supplies the gluteus medius, minimus, and tensor fascise late. It leaves the pelvis above the edge of the pyriformis muscle, and dips between the gluteus medius and minimus.

r. The INPERIOR GLUTEAL NERVE, more generally called the smaller sciatic nerve. This also comes from the sacral plexus, and leaves the pelvis below the pyriformis by the great sciatic notch. It divides into many branches, such as the gluteal twigs, supplying the glutens maximus, the sciatic twig, passing under the tuber ischii, the crural twig, which becomes cutaneous, and may be traced as far as the popliteal space.

6. The Great Science Nerve, the largest nerve in the body, is properly divisible into two distinct portions, a large and a smaller; these are nerviy connected to each other by cellular substance, and may readily be separated. The larger portion becomes altimately the posterior tibial nerve, the smaller becomes the fibular nerve. These are generally united so as to constitute apparently but one nerve, to about the opper part of the popliteal space, where they naturally separate from each other. This great nerve comes from the sugral plexus, leaves the pelvis by the great sciatic noteb beneath the pyriform muscle, and passes behind the gemellus superior, obturator internus, genuellus inferior, and quadratus femoris museles; it afterwards passes in front of the flexor muscles placed on the back of the thigh, viz. the biggers and semi-tendinosus and membranosus muscles. Superiorly, it is covered by the gluttens maximus. At the point where the nerve lies between the tiber isehii and greater truebanter, is the usual scat of the neuralgic affection so ably described by Cotunnius. Remove the integuments from the back of the log quite to the heel, and examine the course of the posterior saphena vein and its accompanying nerve. The rein commences on the back of the first, and towards the direction of the outer ankle, and proceeding up the limb, at first above the aponeurosis, but afterwards beneath it, finally joins the popliteal wein.

in The Posterion Sapherus Nerve is formed of two branches; one from the posterior tibial (communicans tibialis), and another from the fibular (communicans fibularis;) these units in various manners in different subjects, sometimes higher up, sometimes scarcely at all, and quite low down the limb. They come off from their respective nerves towards the upper part of the popliteal space, at first deep and beneath the fascia, but afterwards pass through it and become superficial.

298. The CRURAL APPRETROSES in the leg presents several openings, and one more especially towards its lower part, for the passage of the shorter or pusterior saphena veia. This approximates may also be observed adhering to the fibula and tibia, and dividing inferiorly into two layers, one passing over and embracing the tendo uchillis, the other passing between it and the deep layer of floxors; beneath this second toyer, midway between the tendo achillis and tibia in the lower half of the leg, will be found the pusterior tibial artery.

vein, and nerve; hence the difficulty of finding the artory in the living subject. Open the aponeurosis, and

reflect it as low as the middle of the leg.

999. Recurs Factor Causes. This muscle is simple below, separated above into two bundles, one long and round, attached to the upper and outer part of the tuber ischil by a tendon, common to it and the semitendinosus, which afterwards becomes an aponeurosis extending to the middle of the thigh; this bundle descends from thence outwards, becoming larger, and is incorporated with the other bundle, which is shorter, flattened, quadrilateral, broader at the middle than the extremities, and attached by short appropriates to a large portion of the outer lip of the linea aspera, between the addactor muscles and vastus externas, from which it is separated by a lamina of the fascia lata. The two portions of the muscle are connected by means of an aponeurosis, which terminates in a common tendon. This tendon bifurcates to be inserted into the top of the fibula, embracing the lower extramity of the external lateral ligament of the knee-joint. The anterior branch of this bifurcation sends off a prolongarion which passes over the superior tibio-peroneal articulation. Covered posteriorly by the glutnens maximus and fascia lata; this muscle lies upon the semi-membranesus, vastus externus, and adductor magnus muscles, the sciatic nerve, the femur, and the external lateral ligament of the knee. The long portion moreover covers the short, which is applied upon the external superior articular artery, and the external head of the gastroenemius. Its inner adge concurs with the semi-membranesus muscle to form the ham, and its tendon forms the outer ham-string. This muscle hends the leg upon the thigh, or the latter upon the leg. Its long portion is capable of extending the thigh upon the pelvis, or of keeping the pelvis erect-It also rotates the leg outwards.

300. SERIT-TENDITIONES, long, slender, tendinous, and rounded below; thin, flesby, flattened, and broader above. It is extended obliquely at the back part of the thigh, and arises behind the semi-membranesus, from the taberosity of the isching, by a membraneous tendon, which, for the extent of about three inches, is

common to it and the long portion of the biceps. The fleshy fibres arise from the anterior surface of this tendon, and descend in a converging manner a little obliquely inwards; the bundle which they form, contracting and becoming thicker; when it has arrived at the middle part of the thigh, after being generally traversed by an aponeurotic intersection, it forms a slender and round tendon, which descends behind the inner side of the knee-joint, between the internal head of the gustroenemius and semi-membranosus, turns forward upon the tibia, becomes broader, and is united to the posterior edge of the tendon of the gracilis, as well as with the inner surface of that of the sartorius, to terminute with them upon the tibin. Its posterior surface is covered by the fascin fata, and a little at its upper part by the glutoeus maximus; the anterior is applied upon the semi-membranesus and adductor magnus, A bursa mucosa occurs between its upper part and the hiceps and semi-membranesus, and another at its lower part between the internal lateral ligament of the knee and its tendon, united with those of the sartories and gracilis. It bends the leg, and turns it inwards by rotation. It also bends the thigh upon the leg. In standing it keeps the pelvis erect, and sometimes even contributes to draw it backwards. Together with the next muscle, it contributes to form the inner bamstrings, and bounds the popliteal space in this direction.

301. SERI-MEMBERANOSUS, placed beneath the preceding muscle, flat, thin, narrow, and aponeurotic in its upper third, broader, thicker, quadrilateral, and fleshy in the rest of its extent, excepting at the very lowest part, where it is rounded, this muscle arises from the tuber ischii, behind the quadratus and before the semi-tendineous and biceps, by a flat tendon, whose outer edge is much thicker than the inner, which despends very low upon the outer and back part of the fleshy budy, to be afterwards concealed in its substance. The fleshy fibres are short and parallel, and directed obliquely inwards; they form a pretty long bundle, thin at its extremities, and thick in the middle, and terminate successively in a tendon which occupies their inner edge. This tenden, which is isolated behind the knee-joint, thick and round, is contiguous an-

teriorly with that of the internal head of the gastroenemina, from which it is separated by a synovial capsule, and divides into three portions; the outer, thin and narrow, ascends obliquely backwards and outwards upon the synovial capsule of the knee-joint, which it contributes to strengthen, and is attached above the puter condyle of the femur; the middle portion, which is broad and thick, is attached to the back part of the internal tuberosity of the tibia, and sends a very distinct approparatio expansion over the popultons; the taxer portion, which is larger and rounded, deseends from behind forwards over the internal taberosity of the tibia, and is inserted into it. It is contained by a fibrous sheath which is lined by a very delicate synovial membrane. Its porterior surface is envered by the biceps and semi-tendinosus, and by the fascia lata; the outerior covers the quadratus, from which it is separated by a bursa mucosa, the adductor magous and internal head of the gastroenemius, the popliteal artery, and the knee-joint; its ower edge is accompanied by the sciatic nerve, and concurs with the biceps to form the cavity of the ham; the inner edge is partly covered by the gracilis and the fascia. lata. Its uses are the same as those of the preceding musele.

302. POPLITEAL SPACE. As the tendons of the muscles just described contribute to form the popliteal space, we may here describe its limits; its contents will be examined more carefully afterwards. Anteciorly, the space is bounded by that triangular flat surface of the femur, extending from the groove for the poplitical artery to the interconduloid notch by the back of the joint, the posterior ligament of Winslow. and the popliteus muscle; externally and superiorly, by the tender of the biceps; internally and superiorly, by the tendons of the semi-membranesus, sumi-tendinosus, and gracilis; externally and inferiorly, by the outer head of the gastrocasmins muscle; internally, by the inner head of the same muscle; posteriorly, it is shet in by the aponeurosis and the integuments. It thus occupies about a fourth of the lower part of the thigh, and a fifth or sixth of that of the leg. The fascia, by its union with the condyles of the femur and tibin, and more especially with the tendens of the flexor muscles of the leg, limits and confines the space on all sides, and especially above, thus giving to it a pointed form above and below.

In the course of this dissection, the student may observe brauches of the following arteries, -scintic, internal circumiley, perforating of the profonds, and articular. These last are in the popliteal space; finally, the popliteal artery, which is merely the continued trunk of the superficial femoral. The veins accompany the arteries, for the most part. The principal nerve in this region is the great sciatio, whose course was formerly traced as law as the inferior margin of the quadratus femoris. It here passes before the bireps and semi-tendinosus, but inferiorly, on getting into the popliteal space, it is covered only by the integuments and aponeurosis; anterior to it, about the middle of the thigh, is the adductor magnus. Towards the upper part of the popliteal space, the sciatic nerve, which we have already described as being composed of two great divisions, here separates into those divisions, viz. the peroneal, fibular, or smaller, and the posterior tibial. (There is no such thing as "a populated nerve?" such language is extremely confused and incorrect.) The posterior tibial nerve follows the line of the original course of the sciatic, of which it forms the larger division; it descends through the middle, as it were, of the popliteal space, to reach its ultimate position on the inner side of the malleolus interuns:" this nerve lies behind the vessels. The peroneal or fibular brunch of the great sciatic follows the more oblique enurse of the outer hamstring, adhering close to its inner side, and partly averlapped and concealed by it. The smaller nerve ultimately follows the murse of the smaller bone of the leg; the larger follows more the line of the tibia. The ultimate course of the percosal nerve is rather complex; it pastes below the head of the fibula, miride the neck of that boose and afterwards supplies the integuments and muscles on the outer side of the limb and back of the fast the posterior tibial perve, on the other hand,

[&]quot;When it subdivides into two branches, the internal and ex-

is destined rather to the muncles on the back of the leg and sole of the foot. Whilst these nerves are passing through the popliteal space in the way just described, they give oil several branches; the more remarkable of these are the muscular branches from the posterior (ibial, which supply the heads of the gastroenemii and solens muscles; and a branch sent from each division, which follow a remarkable course, These I venture to call the communicans tibialis, arising from the posterior tibini nerve, and the communicaux fibularis, arising from the fibular or peroscal nerve-These two branches proceed down the back of the legat first below the aponeurosis, but afterwards above it; they follow the course of the posterior saphena vein, and waiting, sometimes high up, sometimes low down, constitute what for some years I have called the posterior saphenus nerve: they have been already spoken of, in describing the aponeuroses on the back of the leg. In the relebrated plates of Walter, this union is represented very low down, but this is not the more common arrangement. The posterior saphenus nerve follows the course of the vein so named, and proceeds, consequently, in the direction of the heel and outer nakle. In tracing the poplitual artery through the popliteal space, it will be found to run pretty much in the axis of the limb. The accompanying vein is atimately united to it by a common sheath. The arrery is deepest; the vein behind, and rather to one side; the nerve a good way behind these, and most superficial. The artery first appears in the upper part of the popliteal space, as it passes through the opening in the adductor magnus; it then descends vertically through the popliteal space, but inclining gradually in its course from within outwards, resting on a cushion of adipose and cellular tissue, interposed betwixt it and the pasterior part of the femur and back of the knee-joint, more especially behind the ligamentum posticum of Winslaw. It next gets between the heads of the gastrocuemius muscle, and crosses behind the coplitons muscle, which can scarcely be seen at this stage of the dissection. It afterwards, a little below the inferior margin of this muscle, divides into two branches, the posterior tibial and fibular, after hav-

ing sent off a very large branch anteriorly, viz., the anterior tibial. In this course the popliteal artery gives off the following branches; 1". Several muscular branches to the vasti and crurious. 2". The external and internal superior articular. 3°. The azygous artirular. 4. Sural or muscular branches to the gastrocnemii muscles. 5". The external and internal articular arteries. These vessels may readily be found in the following situations; the sural descend to the heads of the gastroenemii, and after being examined, should be cut away to allow of the proper examination of the deeper parts. The superior articular lie above the condyles of the femure the azygous articular perforates the ligament of Winslow; the inferior external articular, will be found between the external lateral ligament and the joint; the inferior internal articular occurs between the internal lateral ligament and the tibia. Lastly, in the popliteal space, there are generally a few lymphatic glands not far from the great vein. The space just described, has lost much of its importance in a surgical point of view since the celebrated improvement which Mr. Hunter made on the operation for popliteal aneurism. But even so late as 1814, the operation was performed in the old way in Paris by M. Boyer. He took an hour and twenty minutes to perform an operation, which in England, even at that time, was frequently done in four minutes. The old operation of tying the artery in the popliteal space for ancurism there, is now universally exploded."

303. Superspectal Facta of the Groin. This important fascia is continuous with that found under the integuments of the abdomen, but in passing over Poupart's ligament, it is connected by a thin cellular tissue to the ligament. This cellular tissue has been estremed

The subject should have be turned, and the dissection of the anterior aspect of the thigh commenced; place a black below the pulsis and extend the limb. Next make an insistent shrough the integrments, from the spine of the pulsis to the anterior and superior spinous process of the illum, and a seriord from the same spinous process of the illum, downwards to a little above the ance joint. From the termination of this award incision, very use account the thigh towards its inner side. Reflect this square thap of skin meetly, and thereby expose the superficial fuscia.

by some a separate fascia. Imhedded in the superficial fascia, will be found a great number of superficial nerves; of these, some come from the muscular and cutaneous branches of the lumbar plexus, others from the anterior crural nerve, which likewise comes from that plexus. It is in this fascia that the superficial veins of this part of the limb are mostly imhedded, as it furnishes sheaths to them; by dissecting these sheaths previous to taking off the fascia, they will be hest exposed and understond. The most important of these is the cenn sapkena magna, or interna; this vein will afterwards be found ascending on the inner part of the foot and leg from the direction of the inner ankle, and ascending in this direction to within an inch of Poupart's ligament. Here it passes through the fascia lata or aponeurosis, by an opening much larger than is required for it, but which is filled up, or shut in to great extent by the fascia cribriformis; the opening through this, left for the passage of the saphena vein, is in the lower part of the faceia cribriforms. A pretty firm sheath of cellular substance from the edge of the opening follows the supbena downwards, and prevents the student at first from seeing the opening. Next trace the veins joining the saphena; these run in various directions, some from the inside, others from the outside of the thigh; besides these, two or three will be found descending from the abdominal parietes; these are the superficial epigastrie and superficial circumflex vein of the ilcum. Lying imbedded in the superficial fascia, a little below Ponpart's ligament, the student will find the superficial inguinal glands; they are situated partly above and partly below the fascia, and receive lymphatic vessels from the lower extremity, and from the organs of generation. Hence, their inflammation in venereal diseases, and in injuries of the foot, leg. &c. Other glands lie below the fascin. upon, and in, and also beneath the fascia lata. will be examined presently. Next remove the superficial fascia from without inwards, using great caution whilst opproaching the suphenic opening, and taking care to leave the saphona vein, and the foscia cribriformis, which is situated between the upper part of the saphena and Poupart's ligament. This will expose the

304. FEMORAL APONTUROSIS (fascia lata femoris); strong and tendinous externally, but much weaker internally. Its attachments are, 10. To the crest of the ileum, and as has been already remarked, to the sacral and coccygeal vertebrae, 20, To Poupart's ligament throughout its whole length. Some anatomists consider the femoral aponeurosis and Poupart's ligament as quite contiwasars, but this seems incorrect; they are merely united to each other. This may be proved by cutting away Poupart's ligament with a very sharp knife, when it will be found that the femoral aponeurosis is as tense as ever in consequence of a deeper connexion with the facia transversulis which lies beneath Poupart's ligament, 32. To the rami of the ischium and pulsis. In short, as we have seen, it encloses all the muscles of the thigh, sending numerous partitions or prolongations inwards between them to lay hold of the femur, then giving to most of them a general covering, and a particular sheath. It also forms extensively the sheaths of the great vessels, and more especially of the superficial femoral artery as it passes through the thigh. These important points in its anatomy will be perfectly understond by the student, if he dissects the muscles properly. Next cut through the supliena vein at the distance of about four inches below Poppart's ligament, and raise it up; directed by it, the dissector will be led to examine carefully the inferior border of the suphenic opening. The student may next cut through the exibesform fascia, and laying it over towards the pubis, he thus exposes the common femoral yein, into which the saphena vein passes; also, the crescentie margin or duplicature of Mr. Burns, routing upwards and forwards to Poupart's ligament. By opening the fascia lata a little to the outside of the femoral vein, he will expose the common femoral arisvy, and at a short distance on the iliac side of the artery, he will find embedded below the fascia lata, the crural serve. Returning to the crescentic margin, or falciform process, which presents two portions, a longer one looking towards the pubes, a shorter one looking upwards towards Poupart's ligament, it is easy to see that several different views may be taken of the nature and formation of the cribriform fascio. 1º. It may be considered as a layer of ceilular

substance filling up the space between the iliac and pubic portions of the fascia late, derived either from one source. or from several, but forming the outer wall of the sheath of the femoral vein, and furnishing a partition between the vein and artery, and between the vein and the sac of the crural bernia when this disease occurs. 2º. It may be considered merely as the shouth of the great vessels descending from within the pelvis. 32, It may be viewed as the anterior layer of the fascia lata, which, on the iliac side of the femoral artery, has divided into two layers, a deeper, strong and fibrous, passing behind the vessels, and appearing on their inner side to form the public portion of the aponeurosis, covering the pertineus muscle, and a superficial layer, thin and cellular passing over these vessels, and joining the pubic portion and deeper layer on their inner or pubic side. The fascia cribriformis has several apertures in it besides that for the suphena; in one or two of these lie lymphatic glands; small blood vessels likewise pass through these openings. Farther, it may be observed, that whilst the iline portion of the fasein lata adheres to Poupart's ligament, the public portion passes deeper, as being behind the ressels having attachment to the spine of the pubes and to the linea pectines. It has been already shown that the iliac portion of the fiscin lata, besides being connected to Poupart's ligament, is likewise intimately united to the fascia transversalis beneath it; this is also the case with the forcia cribriformis. Lastly, the cribriform fazera forms, according to same, the anterior wall of a short canal, to which the name of crural canal has been given.

505. Texson Fascia Latis. Make an incision through the aponeurosis directly over the middle of the muscle, and throughout its whole length. Reflect the fibrous sheath thus opened, and clear the surface of the muscle at the same time." The muscle, situated at the

⁴ This mode of spening the sheaths of the numeless directly over their centre, should be followed in the dissection of all the numeless of the thigh and leg: The opposite practice which universally prevails in the dissecting resons of this country, of removing the facts lasts as a sheath uniformly extended over the thigh, thus reglecting and overflooking the surious partitions at transmits between them to the bones, unplies complete ignorance.

upper and outer part of the thigh, is flat, broader and thinner below than above, and arises externally from the anterior and superior lline spine, between the sartorius and glutmus medius, be a short tendon. The fleshy fibres descend vertically, diverging as they proceed, and about three inches below the great truckenter terminate in a separation of the two laminas of the fascia lata, and thus have no fixed attachment inferiorly to any hone. Covered externally by a thin lamina of the fascia lata; the inver surface is separated by another, from the rectus femoris and vastus externus; it also covers the glutzens medius and glutzens minimus a little; its anterior edge, is parallel above to the sartorins, and separates from it below; the posterior is united above to the glutzens medius. This muscle rotates the thigh inwards, and carries it outwards, separating it from the other. Its principal action, however, has been supposed to stretch the aponeurosis by which the muscles of the thigh are enveloped. It may set on the pelvis.* It has lately, in some dissecting rooms, been fashiounble to make an artificial dissection of the aponeurosis below the muscle, leaving a long stripe of it descending to the fibula. This stripe has been exhibited as the tendon of the tensor. Next dissect the

ilo6. Sarrorros. This is the longest muscle in the human body, and resembles a band, a little broader at its middle than at the extremities, lying obliquely along the inner part of the thigh. It arises by a short tendon, equally expanded over its two surfaces, from the anterior and superior illac spine, between the tensor vagine femoris and illaces, and a little from the notch which separates the two anterior spines of the illium. From thence it descends, becoming broader, obliquely inwards and backwards, as far as the upper third of the thigh; it then proceeds vertically, preserving the same breadth to the inferior third; and hastly, opposite the knee, it contracts, and passes obliquely forwards and outwards, to the inner part of the upper

on the part of the teacher of the real structure of this important approximate. Hence the origin of numerous errors in practice.

The nutions regarding the action of this muscle entertained by the author of the "Aminal Mechanics," has been refuted by the Account.

extremity of the tibia, where it is inserted by a long flat tendon, whose anterior edge, arising high upon the flexby fibres, is united to the fascia lata surrounding the knee, while the posterior contributes to form the aponeurosis of the leg. At its lower extremity, this tendon expands into a strong aponeurosis which passes over the tendons of the semi-tendinosus and gracilia, uniting with them, and terminates upon the tibia before them. Asteriorly, covered by the flocia lata; posterior applied, from above downwards, upon the united pseas magnus and iliacus, the rectus femoris, vastus internus, adductor longus, adductor magnus and gracilis muscles, the superficial femoral artery and vein, and, at its lower part, the internal lateral ligament of the knoe-joint. Its inner edge forms above with the adductor longue, a triangular space, in which is lodged the crural artery, with the vein and nerve of the same name. In action it bends the leg upon the thigh, and brings its inferior extremity toward that of the opposite side, so as to make them cross each other; by continuing to act, it bends the thigh upon the pelvis; if the leg cannot be bent, it draws the whole inferior extremity upon the pelvis, turning it outwards in rotation; it prevents the pelvis from falling backwards, or bends it upon the thigh.

307. RECTUS FEMORES. The Rectus Femorie, (Venter prior susculi quadricipitis feworis,) is an elongated muscle, flattened at its extremities, slightly rounded and breader at the middle, and exactly fusiform. It lies vertically at the anterior part of the thigh, and arises from the iline bone by two tendons. One of them is straight and embraces the anterior and inferior spine of that bone; the other, which is longer, broader, and curved, turns round the edge of the cotyloid cavity, to the upper part of which it is attached, sending some fibres into the capsule of the articulation. These two tendons, as may be seen by foreibly raising up the ilineus which overlaps them, after a short passage, unite into a single tendon, which descends vertically, and almost immediately expands into an aponeurosis, occupying the fore part of the apper third of the muscle, and gives rise posteriotly to the fleshy fibres. These form a vertical and bulging bundle, and are inserted

successively into the fore part of another aponearosis, which lies upon the posterior surface of the muscle, from the place where the other terminates. This aponeurosis, after becoming narrower and thicker, separates and forms a flat tenden, which is united with those of the three following muscles. The anterior surface in covered by the fiscia lata, and by the iliacus and surtorius muscles; the poderior is applied upon the hip-joint, the external circumflex vessels, and the cruralis. It extends the leg upon the thigh, or the thigh upon the leg; if the leg is extended, it heads the thigh upon the pelvis, or the pelvis upon the thigh; when one is standing, it fixes the pelvis, and provents it from falling back.

308. VASTUS EXTERNUS. (Fester externus pousculi quadricipitis (cancis) thicker above than below, and attached to the base and forepart of the great trochanter, as well as to the outer lip of the linea aspera, and, together with the glutaus maximus, to the ridge by which it is connected with the great trochanter, by a broad anoneurosis, expanded over its outer surface to near the middle of the thigh, thick and dense at its upper part, thin and with separated fibres below. The fleshy fibres of the muscle arise from the inner surface of this aponeurosis, and another aponeurotic lamina placed between it and the short portion of the bineps, and fromthe outer surface of the femur; they are directed obliquely downwards and forwards, and longer above than below, where they become nearly transverse; the last fibres even take their origin from the two upper thirds of the line which descends to the outer condyle of the femur; they form together a mass, broader and thicker at its middle part than at the extremities, which is ut first separated from the cruralis by a thin layer of cellular tissue, becomes inferiorly inseparably united with it.

On fividing the rectus in the middle, and reflecting it and the seriories, which may either be removed from the spine of the tions or cut serios; all the front and sides of the femus, nearly from one extremity to the other, will be found inveloped by a very proveful muscle which the other mateurists considered as three, under the masses of varie and crureas. Properly quaking, however, they form but one, and as such they will one day be on doubt described. We may will continue to speak of them as three.

309. VASTUS INTERNUE. (Feater internue on quadricipitis femorie.) is seldom distinct from the following muscle, and is much smaller than the preceding; it appears more bulky below than above. It is attached to the anterior and inferior part of the base of the small trochanter, and to the inner tip of the linea aspera, by appneurosis, and which descends to the middle of the thigh. The fleshy fibres come from the inner surface and anterior edge of this aponeurosis, as well as from the inner surface of the femur, and from the two upper thirds of the ridge which descends to the inner condyle; they are directed obliquely downwards, forwards, and outwards; the upper are longer than the lower, which are suited along the linea aspera with the adductor muscles.

310. CRURALIS. (Venter pasterior in quadricipitis femoris,) arises from the fore part of the base of the neck of the femur, along the oblique ridge which procoods from the great to the small trochenter, and from the three upper fourths of the apterior surface of the budy of the femur. Its fleshy filtres form a mass which descends, increasing in size, and which, at first isolated, soon mix with the two preceding muscles, but first with the vastus internus. These three muscles, the vastus externus, the vastus internus, and eruralis, are thus united by broad aponeuroses. One of these commences high upon the inner surface of the first; the other rises about the same level upon the outer surface of the second, and the last appears toward the middle of the anterior surface of the third. They approach each other as they descend, become intimately united, and form a tendon at first broad and thin, afterwards narrower and thicker, and at last intimately united with that of the rectus femoris with which it is inserted into the whole apper part of the patella, sending off interally two fibrous expansions embracing that bone, and are attached to the tuberosities of the tibin, along with portions of the fascia lata. The fleshy fibres of the vastos internus accompany it to near the patellaunterior surface of the vastus externus is covered above by the tendent of the glutness minimus and glutness maximus; farther down, by the fascia lata and its tenor muscle, and at its lowest part, by the short portion

of the bicops: The anterior surface of the cruralis is in connexion with the iffacus and remas foreoris, and with the external circumflex vessels. The fascia lata, the crural artery, and the sarturies muscle are applied upon the anterior surface of the vastus internus. The posterior surface of these muscles covers extraorively the surface of the body of the femur, from which it is separated below by a considerable quantity of adipose cellular

tissue, and the knew-joint.

311. Subcrements a few detached muscular fibres, frequently found under the lower part of the cruralis, and attached to the symmial caprate of the knee-joint, have been described as a separate muscle, under the name of Subcrement or articularis genu. When the knee is extended, it seems to draw up the capsule of the joint from between the end of the bones. To expose the subcrements, the vasti and crumens must be removed. These muscles contribute powerfully to extend the leg upon the thigh, and the latter upon the former. Along the inner and outer sides of the femur

few muscular fibres adhere,

312. Gracilla is situated on the inside of the thigh. long flat, thin, broader above than below; arises, over a space of about two inches, by aponeuroses much longer before than behind, from the anterior surface of the publis, close to the symphysis, from the ramus of that hone, and of the ischium, being thus situated between the triceps adductor and erector penis. From thence it descends vertically on the inside of the thigh, contracts rapidly, and when near the knee, forms a rounded tendon, which commences on the posterior edge of the muscle at the middle of the thigh, and is accompanied anteriorly by fleshy fibres as far as the knee. There it becomes free, passes behind the inner condyle of the femur, enlarges, descends from behind forwards over the upper and inner part of the tibin, unites with the tendon of the semi-tendinosus, and is attached to the bone behind that of the sarrorius. By its posterior edge it sends a fibrous expansion to the aponeurosis of the leg. Its inner surface in covered by the fascia lata, and below by the sartorius; it is superficial marly throughout its whole extent. The outer covers the adductor and semi-membranosus muscles,

and the internal ligament of the snee joint. In action it bends the leg upon the thigh, or the thigh upon the leg.

313. PECTINEUS, or MUSCULUS-LIVIDUS, clongated, flat, triangular, broader above than below, situated at the upper and fore part of the thigh. It arises by about aponeurosis from the horizontal ramus of the pubes, between the spine of that bone and the Hoo-pectineal eminence. It descends from thence obliquely outwards and backwards, contracts, and opposite the small trochanter turns upon itself to be inserted, by means of a flat tendon, into the ridge which descends from that process to the linea aspera, immediately beneath the insertion of the passas magnus and iliacus internus. Its auterior surface is covered by the pubic portion of the fascia lata, and the crural vessels lie upon it inferiorly. The purerior lies upon the horizontal runns of the pubes, the hip joint, the obturator externus and adductor brevis muscles, and the obturator vessels and serve. Its inner edge is slightly covered by the long adductor; the outer is parallel to the psoas. The internal circumflex and first perforating arteries are situated, the one close to the inner and upper margin of the musels, the other close to the lower margin. The pectineus muscle heads the thigh upon the pelvis. It brings it towards that of the opposite side, or turns it outwards in rotation. It also bends the pelvis upon the thigh or keeps it in its natural position. The crural or femoral bernin descends upon that portion of the aponeurosis which covers the pectineus. Poupart's ligament is stretched over its upper edge, and the ligument of Gimbernat approaches close to the inner edge of its origin-

814. Annucros Losces, "long, flat, thick, triangular, breader below than above, situated before the other two adductors, at the inner and upper part of the thigh. It arises, by a narrow but strong tendon, from below the spine and from the anterior surface and symphysis pubis. It is prolonged for a time under the form of an appneurosis, over the inner edge of the fleshy body.

The older anatomists, who described the merps extensor of the leg (vasti of crumens) as three muscles, although they really constitute but one, were regardly errors in respect to the from adherous, which they spoke of as ear, although they really are three guite distinct muscles.

which descends obliquely outwards and backwards, becoming broader and thicker us far as its middle part, but which then becomes thinner, to terminate between two aponeurotic laminar uniting into a single one, attached to the middle part of the interstice of the linea aspera, over a space of about three inches, between the vastus internus and adductor magnus, with which it is firmly united. This aponeurosis sends some fibres to the tendon of the latter muscle, which concur, with it, to form an aperture through which the crural artery passes. The auterior surface is covered by the fascin lata, the sartorius, and the crural artery and vein inferiorly. The pasterior covers the other two adductor muscles, (and the lower part of the arteria profunda femoris), and is firmly united to them below. Its outer edge is parallel to the pectinens muscle; the inner is conscaled by the gracilis. It brings the thigh toward that of the opposite side, bends it a little, and curries it outward by rotating it. When one stands upon a single foot it keeps back the pelvis. Cut through the adductor longus about an inch below its origin, and after reflecting it towards the femur, dissect the

315. Appecros Brevis, placed behind the preceding, and smaller and shorter. It is triangular, flattened from within outwards in its upper third, and from before backwards in its two lower thirds, and rises, by short aponeuroses, from almost the whole space which separates the symphysis pubis from the obturator hole, whence it descends outwards and backwards, becoming broader and thinner, to be inserted, by a less developed aponeurosis than that of the preceding muscle, which aponeurosis is traversed by the perforating arteries, into the middle part of the linea aspera, for a space of about three inches, proceeding from the small trachanter. At this insertion, the adductor brevis is incorporated with the adductor longos, adductor magnus, and the pectineus. This muscle is covered anteriorly by the preceding, and by the pectineus; parteriorly, it is applied upon the adductor magnus; intervally, it is connected with the gracilis, and externally, with the tendon of the peops magnue and ilineus, and with the obtaraine externus. Its uses are the same as those of the preceding muscle.

Cut through the origin of this muscle, and next dissect the

316. Appropria Magnes, triangular, like the other adductors, but of much greater extent. It arises, by a broad and thick tendon, which sends an aponeurosis behind its fleshy filtres, from the base of the tuberosity of the ischines, and by short aponeuroses from its ramps. The florby fibres which arise from these different origins become longer in proportion as they are examined more internally; the upper are nearly transverse, and much twisted, and frequently seem to form a distinct muscle; they rame from the ramus of which we have just spoken, and are attached to the upper fourth of the lines aspers. of the femur, and to the ridge which unites it to the great trachanter, passing before the rest of the muscle. The middle fibres, which are longer and more oblique, terminate in the three inferior fourths of the lines aspem, by a pretty long aponeurosis, which is confounded with the insertions of the two other adductors, and is perforated by several apertures for the perforating arteries; but, at the end of the lines aspers, it biforcates in such a manner, that one of its partiens ends in a point between the vastus internus and the short head of the biceps, while the other proceeds towards a tendon, which terminates the vastus internus. Between these two portions, there is an interval or fibrous canal traversed by the crural artery and vein. Lastly, the inner fibres are inserted into a tendon which commences high upon the inner edge of the muscle, sends a fibrous prolongation before the crural artery, unites with the aponeurous of the adductor longus, and is attached to the tuberosity of the internal condyle of the femur, where it is incorporated with the inner edge of the vastus in-The auterior surface of this muscle is covered by the two preceding, by the surforius, and by the crural artery. The posterior covers the semi-tendinosus, semi-membranosus, biceps, and glutaeus maximus museles, and the sciatio nerve. The issue edge is in connexion with the fascia lata, the gracilis and sartorius muscles. Some branches of the internal circumflex artery pass in the cellular space between this muscle and the lower margin of the quadratus femoris. This muscle brings the thigh powerfully toward that of the opposite side, keeps the pelvis in its natural position.

and has the same uses as the other adductors,

317. Obtunator Extensus.-Toexposethismuscle fully, nearly all the others just spoken of must be divided and reflected towards the femur, being still left attached by their femoral attachments. The sartorina may be divided about the middle; the pectineus, adducfor longus, and adductor brevis, near their origins; the adductor magnes in the same manner. On clearing away the cellular substance and blood-vessels, the obturator externus will be exposed. This muscle is situated at the upper and inner part of the thigh, and of the form of a flattened consid: arises from the lamina of the os innominatum which limits the obturator hole anteriorly, and from the inner part of the anterior surface of the obturuter membrane. From thence, it descends outwards. becoming narrower, then ascends behind the neck of the femur, where its fleshy fibres terminate upon a tendon, which comes from several slips that had existed in the substance of the muscle; contracts, becomes thicker, and is inserted into the cavity of the trochanter beneath the inferior gemellus, after contracting strong adhesions with the capsular ligament of the hip joint. Its onterior surface, which is inclined downwards, is covered by the pectineus, the adductors, and quadratus. The posterior is applied upon the os innominatum, the obturator membrane, from which it is separated by cellular tissue externally, and upon the fibrous capsule of the hip-joint; its apper edge corresponds internally to the obturator nerve and vessels; the lower edge is placed, also internally, above the attachment of the adductor magnus. This muscle rotates the thigh outwards, and draws it towards the other. During the dissection of the anterior aspect of the thigh, the following vessels and nerves will be met with.

A. The Corner French Artery is a continuation of the external line; it passes under the crural arch, about midway between the spinous process of the ilium and the symphysis publs. After a short course, which saries, however, in different subjects, it subdivides into two great arteries, called superficial ferroral and deep femoral.

B. The Superficial Fesional merely passes through

the thigh on its way towards the log, (to which it more particularly belongs), and having passed through the adductor magnon, it gets the name of poplitual artery,

c. The Deer Femouau Antery (Ar. Profunda Pemores), in its course is deeper than the superficial femoral, and ultimately runs beneath the adductor longue, and perforates the adductor magnus. In the course of these great arteries, the following branches are usually given off, subject, however, to considerable varieties, From the common femoral arise, 17, the Art. Epigastrica Superficialis. 2º. Arter. Padiça Externa- 3º. Arter, Chenmilexa Ossis Ilii, 4% Arteria Femoralis Superficialis. 5º. Arteria Femoralis Profunda. From the superficial femoral artery arise very few branches of consequence; a few muscular branches, and an artery called the unantomotion magna, just before the principal trunk passes through the adductor magnus, or while it is passing. The arteria profunda femoris gives off in general the arterios circumflexa interna and externathree and sometimes four perforating arteries, besides several muscular branches. The veins follow pretty nearly the course of the arteries, and have similar names. Beneath the pectineus will be found the terminating branches of the obturatrix artery, and the accompanying veins. The nerves met with throughout the dissection of the anterior aspect of the thigh are elitely the erund and its branches, and the obturator. A remarkable branch of the crural, (the nevens supkense langue), follows the superficial femoral artery throughout a part of its course, but leaves it as the artery is passing through the tendinous shouth of the adductor magnus, afterwards accompanying the vein of this name. The student is referred for a particular account of the blood versels and nerves to the sections on the anatomy of the arteries and nervous system.

318. Aponeurous of the Luc. This aponeurous is exposed by removing the integuments and superficial fascia; in the facia, or suboutaneous cellular membrane, will be found a few superficial veins, and numerous branches of the fibular nerve. The aponeurous on the anterior aspect of the leg is strong, and gives a general covering to the whole, with the exception, perhaps, of the inner surface of the (bia. The superficial

nerves and vessels inhedded in the subcutaneous cellular substance, separate it from the integuments; a fine cellular substance separates it from the muscular fibres. where they do not absolutely adhere to or arise from its inner surface. From this inner surface there arise 19, an aponeurotic partition separating the muscles of the pratibial region from the peroneal muscles; 20, another principal partition separating these personnal muscles from the posterior muscles of the leg. There are thus three great sheaths formed by the fibrous envelope of the leg. Anteriorly, the aponeurusis of the leg is continuous with that of the thigh over the anterior surface of the patella; it adheres also to the external border of the anterior tuberosity of the tibit, to the head of the fibula, and laterally to the tendon of the biceps. Its connexions and course posteriorly, will be described when examining the muscles on the back of the leg. Inferiorly, it is attached to the anterior annular ligament of the tarsus, and seems even to pass over it, thus becoming continuous with the dorsal aponeurosis of the foot. The fibres of the aponeurosis of the leg run in different directions, some being circular, others oblique. The auterior annular ligament of the tarms arises from the calcaneum, by a parrow thick extremity proceeding afterwards from without inwards, and subdivides into two principal bunds, viz. It, one superior belonging to the tibialis articles museles, also binding down the tendons of the extensor communis digitorum, and of the peroneus tertius. when that muscle is present; (between these two complete sheaths there is an incomplete one for the tendon of the extensor propries pollicis.) 27. The in/trior band of the number ligarent proceeds across the instep to the inner side of the tarsus and foot generally, and becomes continuous with the internal division of the plantar aponeurosis. The inferior band is merely a second annulus ligament, furnishing a fibrous sheath to the tendons of the muscles already mentioned. Beneath these fibrous sheaths of the anterior annulur ligaments (which are really relimments) there are aynovial bursas. The dorsal aponeurous of the foot is a deficate layer connected superiorly to the annular ligament, and seemingly continuous with that of the fogIt furnishes a general covering to the muscles and tendons of the dorsum of the foot, and terminates anteriorly towards the extremity of the metatarsal hones; there are likewise four dorsal interassol apameuroses, lying between the metatarsal hones, and envering the interoscal muscles. The external and internal muscles figuerols will be described along with the peroneal muscles and dexors of the toes. The plantar aponeuroses will be best considered along with the muscles of the sole of the foot.

319. TIBIALIS ANTICUS. Long, thick, fleshy, arises from the external inberosity and upper half of the outer surface of the tibin by short aponeurotic fibres, from the upper and fore part of the interpseque membrune, from an aponeurotic partition which separates it from the extensor digitorum, and from the upper part of the inner surface of the aponeurosis of the leg : it descends obliquely inwards and forwards, becoming at first a little thicker and then diminishing; terminating about the middle third of the leg by a flat tendon which descends before the anterior extremity of the tibla, passes over the ankle joint, in a groose of the anterior annular ligament of the tarsus, proceeds over the back of the foot, becomes broader, and arrives at the inner side of the internal canciform bone, where it divides into two portions; the posterior of which is larger, slides over the bone by means of a small synovial membrane, and is inserted at its base; while the other, which is anterior and smaller, is attached to the inner and lower part of the posterior extremity of thefirst pactasarsal bone. Externally corresponding to the extensor communis digitorum above, and the extensor propries pollicis below, from which it is separated posteriorly by the anterior tibial nerve and vessels. Its posterior edge covers the interessions membrane, the tibio, the tibin-tursal articulation, and the upper and inner part of the tarsas. The tibialis anticus bends the fact upon the leg, and directs its point inwards at the same time that it raises its inner edge. It also bends the leg upon the foot. Draw this muscle aside,

320. Extension Property Politicia Proje. Fleshy, broad, thick, and transversely flattened above, slender

and tendinous below, and situated to the outside of the preceding. Arises, by short aponeuroses, from the fore part of the inner surface of the fibula, over an extent of five or six inches processling from the lower part of its upper third, and from the neighbouring region of the interesseous ligament. The fleshy fibres descend, form a bundle of fibres, all about two inches in length, terminating successively upon a tenden which becomes free toward the nukle, passes into a groove beneath the annular ligament of the tarsus, runs along the inner edge of the foot, slides over the proximal phalanx of the great toe, with which it is connected by two fibrous expansions, and is inserted into the distal phalanx, over which it is expanded. The tendon is sometimes cartilaginous where it passes over the proximal extremity of the distal phalanx. This tendon, which is broader near its insertion and upon the tarsus than in the rest of its course, is surrounded by a synovial capsule whilst passing under the annular ligament. Internally corresponding to the tibialis antique, and to the anterior tibial nerve and vessels. Externally applied against the extensor communis digitorum. Its anterior edge is concealed above between the tibialis anticus and extensor digitorum, and covered below by the tibial aponeurosis and the skin. The posterior edge lies upon the fibula, the interesseous membrane, tibin, anterior tibial artery, ankle-joint, and back of the foot and great toc. This muscle extends the distal phalanx of the great toe upon the first, and the latter upon the first metatarsal hone. It also bends the food upon the leg, or the leg upon the foot.

321. Expenses Lescon Constants Dictronus Papers, Elongated, thin, transversely flattened, simple and fleshy above, divided into four tendous below. Arises from the external tuberosity of the tibia, between the tibialis anticus and peroneus longua, from the two aponeurotic partitions which separate it from each of these muscles, from the anterior ligament of the upper tibio-peroneal acticulation, from the interessents ignment, from the fore part of the flouds over a space of five or six inches, and from the tibial aponeurosis at the upper part of its inner surface, the floshy three-proceeding from these different insertions follow various

directions. The upper are vertical, the lower more and more oblique; they form a mass which descends obliquely inwards, and is larger in the middle than at its extremities; they are all inserted into a tendon which is at first concealed in their substance, and appears upon their anterior surface about the middle of the leg, being accompanied by them posteriorly as far as the annular ligament of the tarsus. Before arriving there, the fleshy fibres and the tendon are divided into three contiguous portions, which pass beneath it in a grouve invested with a distinct synovial capsule, common to them with the tendon of the peroneus tertius. The inner portion bifurentes, so that upon the back of the foot there are perceived four tendous which separate from each other, directing themselves toward the four last toes, and crossing the direction of the extensor brevis digitorum; the inner is abviously stronger than the others, and the outer frequently receives a fibrous prolongation from the tendon of the peroneus brevis. Upon the upper surface of the phalanges, the first three are united with the inner edge of the tendons of the extensor brevis, and they are all strengthened by a prolongation of the tendons of the lumbricales and interessei. They then become broader, and form an aponeurosis which covers the whole upper surface of the toes, dividing and terminating precisely in the same manner as the tendons of the extensor communis digitorum manus (233.) The anterior edge of this muscle is covered by the tibial aponeurosis to which it adheres above, the annular ligament of the tarsus, and the skin. The posterior covers the fibula, the interosseous ligament, the tibia, the ankle-joint, the extensor brevis digitorum, and the toes. The inner corresponds to the tibialis anticus and extensor propries pollieis, and is united above with the former. The outer is confounded above with the peroneus longus, at the middle with the peruneus brevis, and below with the peroneus tertius. It extends the three phalanges of the last four toes, and bends the foot on the leg, or the leg on the foot.

322. Prankers Trayies is not always present, and might at all times be regarded as an appendage of the extensor communis, situated at the anterior and inferior part of the leg, clongated, thin and compressed. Arises from the lower third of the fore part of the fibula, the interesseous ligament, and an aponeuratic partition which separates it from the peroneus brevis; descends a little inwards, and degenerates into a tendon which lies at first upon its anterior surface, then becoming isolated, passes under the annular ligament of the tarsus, in the same groove with those of the extensor communis, torns outwards on the back of the foot, crosses the course of the extensor brevis digitorum pedia, becomes broader, and is inserted at the outer edge of the posterior extremity of the fifth metatarsal bone, and into the neighbouring part of its body, sending a prolongation to the outer tendon of the preceding muscle. Cut through and reflect the tendons of the extensor communis, and dissect the

323. Extensor Bravis Digitorum Papis, thin and fleshy behind, terminated anteriorly by four tendons. Arises from the upper surface of the calcaneum, before the groove which lodges the tendon of the peronens brevis, from the external ligament of the calcaneum and astragalus, and from the annular ligament of the tarsus, divides into four portions, the two inner of which are larger and shorter; each of these is terminated by a thin and flat tendon, which cross the direction of those of the extensor longus, passing under them, and crassing the metatarsal region obliquely, The first, near the articulation of the metatarsus with the pholanx of the great toe, becomes broader and is inserted at the upper part of the posterior extremity of its proximal phalanx. The other three pass over the upper surface of the proximal phulanges of the second, third, and fourth toes, and join the outer edge. of the tendons of the extensor longus muscle to terminate along with them. In the dissection of these muscles, the following parts besides the muscles and their tendons may be observed. In The auterior tibial artery and its accompanying veins. 29. The anterior fibular artery. 3º. Certain branches of the peroneal nerve. The anterior tibial artery may be considered either as a branch of the popliteal artery, or as one of its terminating branches. It is first mot with in this dissection at the upper part of the interesseal space.

having passed through the opening found at the top of the interesseal ligament. It is here placed between the tibialis autieus and extensor communis digitorum; the nerve is separated from it by the fibula. Lower down the artery, still lying on the interesseal ligament, is found between the tibialis anticus and extensor proprius pollicis, and still lower down between the tendon of the propries politics and of the extensor communis-It next passes under the anterior annular ligaments of the tarsns, lying successively on the tibia, the ankle joint, the astragalus, navicular, and cunciform bones, proceeding towards the space between the first and second metatarsal bones, into which it sinks near the proximal end of the space, and ultimately communicates with the external plantar artery. In this course it gives off the following branches: 1% The recurrent branch; 2". Several muscular branches; 5°. The two malleolar branches; 4". The tarsal; a". The metatarsal arteries. It then divides in the space between the metatarsal bones into two branches; the smaller supplies the great the, the larger becomes the ramus communicions, connecting it through the external plantar with the circulation in the posterior tibial artery. Veins accompany all these arteries and their branches. The anterior peroxeal artery is a branch of the common peroneed or fibular. It may be a large artery or a small une; it usually perforates the interesseal ligament from an inch to two inches above the external malleolus, anastomoses with the anterior tibial, or with some of its branches, and not unfrequently takes its place. The series met with at this stage of the dissection come from the fibular. This large nerve, after winding round the neck of the fibula, divides into several branches, of which the most remarkable are the anterior tibial and the musclo-cutaneous branches. To understand these nerves properly, the student, after having examined the muscles, should trace the nerves through the substance of the perqueus longus and extensor communis, and between these muscles and the fibula.

324. Arangements of the Leg, external or peroscal aspect. The aponeurous on the peroscal aspect of the limb is strong. The external annular ligament of the tarses is met with in this dissection, and is a powerBut relimentum, binding down the tendens of the peroneal mencles. It extends from the malloclus externes to the calcaneum; it afterwards subdivides into separate sheaths, for each of the peroneal tendens. Internally it is completed by the external lateral figureries of the joint.

325. Peroneus Longus, placed at the outer part of the leg, and under the sole of the foot. Arises from the upper part of the tibial aponeurosis, the upper third of the outer surface of the fibula, a small part of the tibin, two aponeurotic partitions which are placed between it and the solens and flexor lengus pullicis, on the one hand, and the extensor communis digitarum un the other. It descends obliquely backwards, enlarging in the middle, and terminates by a tendon which commences very high upon its outer and anterior side, and only becomes free about two thirds down the leg. This tendon continues to run along the fibula, directing itself however a little backwards, and behind the external malleolus enters a groove, rommon to it with that of the peroness brevis, in which it is kept down by a retinaculum or annular ligament: the synovial capsule which it contains is common to the two tenduns, to the retinaculum itself, the surface of the external lateral ligament, and the groove of the fibula. Beneath the malleolus it quits the tenden of the peraneus brevis, and passes into a groove on the outer surface of the calcaneum, where it is again kept down by a particular fibrous sheath, but lined by the same synovial membrane, which forms a cul-de-sac towards the ca cuboides. It then turns over the side of that bone, penetrates into the deep groove which it presents, and is there bound down by another ligamentous sheath, which also contains a distinct synovial membrane. It then directs itself inwards and forwards, and is inserted upon the lower and outer part of the penterior extremity of the first metatarsal bone. A sesumoid bone is often met with in its substance, to the outside of the os cuboides, and another is occasionally observed behind the mallealus externus, or along the calcaneum. This part of the tendon which crosses the sale of the foot obliquely curnot be seen until after the disacction of the muscles in the sole of the foot. In the leg, the outer surface of the peroneus longus is covered by the tihial aponeurosis;

the inner is applied upon the fibula, and the extensor digitorum communis and peroneus brevis; the posterior corresponds above to the soleus, and is united below to the flexor longus pollicis. It extends the foot on the leg, turning its point outwards, and raising its outer edge. It also acts upon the leg, which it extends upon the foot. Pull uside or cut through the perancus longus, and clean

326. The Peroneus Brevis. Arises from the lower half of the outer surface of the fibula, and from two aponewrotic partitions, which separate it anteriorly from the peroness tertion and the extensor communis digitorum, and posteriorly from the flexor proprius pollicis. It descends obliquely ontwards, and, at the lower part of the leg, forms a teudon which had commenced very high upon its outer side. Behind the malleolus externus, the tendon enters a greave, common to it and the permeas langus, and on emerging leaves the tendor of the peroneus longue, passes above it over the outer surface of the calcansum, where it is separated from it by a fibrous partition, becomes broad, and is inserted at the upper part of the posterior extremity of the fifth metatarsal hone, frequently sending a prolongation to the extensor tendon of the little toe. Its outer surface is covered by the peroneus longus and tibial aponeurosis. The isner covers the fibula, and corresponds to the extensor digitorum communis and peronous tertion, and at its lowest part to the flexor longus pollicis. The synovial membrane which envelopes its tendon and that of the preceding muscle behind the malleolus, is prolonged into the particular sheath which contains it alone opposite the calcaneum, so that it seems bifferented at its lower part-It extends the leg and foot mutually upon each other, raising the outer edge of the latter a little.

327. Postarion REGION of the Luc. Make an incision from the popliteal region down the centre of the back of the leg, (if not already done,) over the calcuneum, and continue this incision through the centre of the sole of the font quite to the tues; reflect the integuments by making convenient flaps. Beneath the integuments over the maileolus externus, there is a subentaneous bursa discovered by Beclard. Next examine the plantar aponeurosis, and particularly that part of the

general aponeurotic covering which lies between the malleuli and the calcangum. The internal annular ligament may be described as composed of two layers; a first or general one, covering in and protecting the plantar arteries and nerves, the tendons of the flexor communis, tibialis posticus, and flexar proprius pollicis. Benegth this runs the termination of the posterior tibial artery, terminating in the plantar afteries, likewise the posterior tibial nerve terminating in the plantar nerves, and the veins corresponding to the arteries. But the tendons lie still deeper, hound down by a fibrous sheath or proper retinaculum, with which the fibrous covering of the vessels has nothing to do. Thus the sheath of the nerves and vessels may be laid open and yet more of the tendons exposed. The same may he said of the tendons. Generally speaking, the connexions of the aponeurosis and of the retinacula are to the calemoum and to the malleolus internus. The order, then, in which these parts are situated, is as follows: 1% About the middle space, and superficially, as compared with the situation of the tendous, run the arteries and nerves; 2% close behind the malleulus interms, and bound down by their own retinaculum, are the tendons of the tibialis posticus, and flexor communis; whilst, 3), still deeper in the hollow of the calcanount, and also having its own retinaculum, will be found the tenden of the flexor propries pollicis. All those fibrous sheaths have their synovial bursus, and are quite independent of each other. The retinaculum of the peroneal temions has been already examined whilst describing these muscles. Next dissect the

A. PLANTAR APONECROSIS. This may be almost considered as composed of three; an internal, middle, and external, having a similar arrangement to what takes place in the hand; but the relation of those aponecroses of the fost and hand to the muscles, arteries, and nerves which he above them, is widely different; so that while the greatest caution is requisite in laying open the middle polmar aponeurosis, to allow of the recase of deep stated porulent matter, and to rollove inflammations, little or none requires to be observed in respect to that of the foot. Having cleaned the plantar aponeurosis, proceed to their exercial examina-

tion; first, undisturbed, or in sile, and afterwards by slitting them open longitudinally. The middle plantar aponeurosis is extremely strong, is fixed into the internal tuberosity of the caleaneum; at first contracted, it spreads out without becoming much thinner, and having arrived at the distal extremities of the metatarsal bones, it then divides into four bands, which again subdivide, embracing the flexor tendous of the four small toes, forming for them a sheath almost complete, and which is inverted into the upper and latteral edges of the anterior ligament of the metatarso-phalangeal joints, and becoming continuous with the fibrons abenths of the These four sheaths are separated by three arches, under which pass the lumbricales and interesscal muscles, likewise the plantar vestels and nerves. The edges of this aponeurusis curve upwards to inclose partly the flaxor communis digitorum brevis, to be intimately united to the external and internal aponeuroses, and thus to form septa, or partitions, complete at some parts, incomplete at others. The transverse fibres are remarkable anteriorly; and the aponeurosis not only serves the purpose of one, but likewise acts as a powerful ligament. The flexor communis brevis at its origin. arises in common with it from the os calcis. The external plantar aponeurosis is very strong posteriorly, weaker anteriorly; superiorly, it gives attachment to the abductor minimi digiti and bifurcates on a level with the proximate extremity of the fifth metatarsal bone. The internal plantar aponeurosis is thin compared with either of the others. It begins posteriorly by a kind of arch, extending from the malleolus externus to the calcaneum; it is also attached to the inner edge of the tarsus, is continuous with the doraul aponeurosis; externally, it is intimately connected to the middle plantar aponeurosis, and by the partition formed between them, completes the sheath for the abductor policis musele. The aponeuroses just described, thus form three sheaths for the muscles of the sole of the foot; the crternal plantar sheath incloses the abductor minimi digiti and flexor brevis; the middle plantar should incloses the flexor communis digiti brevis, the tendon of the flexor communis loughs, the musculus accessorius, the lumbricales, the tendon of the flexor propries pollicia longus, the adductor pollicis, and the transversus polls, the external plantar vessels and serves. There is, moreover, a thin aponeurotic layer separating superiorly the flexor communis from the accessorius and tendons of the long flexors. The adductor pollicis has a thin sheath of its own, so likewise has the transversus polls. These are muncles which the student will afterwards meet with in the course of his dissection of the feet.

328. The Gastrockentus, (Genedlus), is composed of two fleshy musses, called the outer and inner heads, resembling each other in form, separated above, and united below by means of a common aponeurosis. Their direction is nearly vertical, and their form elliptical; they are sonvex behind, flat before. The inner is always larger, and descends lower than the outer. The latter arises from the back part of the outer coudyle of the femur, by a pretty strong tendon which doseends on the outer edge of the muscle over an extent of about two inches, and then becomes an aponeurosis which descends very law upon its posterior surface-The inner arises from the back and upper part of the inner condyle of the femur, by a broader and thicker tendon, which desentes upon its inner edge, and becomes, in like manner, an aponeurosis. The fleshy fibres arise from these two tendons and their aponeuroses; they are rather short, pass obliquely downwards and forwards, and terminate successively on the posterior surface of a broad apuneurosis, which is at first divided so as to correspond to each bumile, and then becomes simple, and unites them with each other and with the soleus, but much sooner externally than internally. By their separation, the two bends contribute to the formation of the bollow of the ham. The inner is covered above by the semi-membraneous, and in the rest of its extent by the aponeurous of the leg, which antirely covers the outer. Their anterior surface is applied above upon the condyles of the femur, and the synovial membrane of the knee-joint, which lines their tendons a little. The outer is in connexion at this place with the popliteus, and the inner with the semimembranosus, from which it is separated by a small bursa, the popliteal artery, and the poplitous and plantaris muscles: In the rest of its extent, the anterior

surface of the gartroenemies lies upon the soleus. Cut through the two heads of the gastroenemies about an

inch below their origin; this will expose

329. The Source, broad and thick in the middle, contracted at the extremities, and of an aval form. Three distinct aponeurones give rise to its fleshy fibres, which are very numerous. The first, which is broad and thin, is attached to the upper extremity of the fibula, and to its outer edge; it descends very low upon the outer edge of the anterior surface of the muscle, The second is a kind of fibrous arch, whose convexity is directed downwards, under which, that is in front of which, the popliteal vessels pass; it unites the preceding aponeurosis to the third, which is attached to the posterior oblique line of the tibia, and the middle third of the inner edge of that bone, and is expanded over the inner and fore part of the muscle. From these origins, the fleshy fibres discend in a converging manner, and terminate successively at the fore part of a broad and thin aponeurosis which extends over their posterior surface, almost from their upper extremity, and sends into their interior a sort of fibrous partition or raphe, into which they are inserted, like the barls of a feather into the shaft. Inferiorly, this aponeurosis unites with that of the gastroenemins, and contributes to form the tendo Achillis. The posterior surface of the soleus is covered by the gastrocnemius and plantaris, and by the aponeurosis of the leg. Its asterior surface covers the peroneus longus, popliteus, flexor longus digitorum, flexor longus pollicis, and tibialis posticus muscles, a portion of the posterior surface of the fibula, and the popliteal, posterior tibial, and fibular vessels. The tendo Achillis results from the union of the inferior aponeuroses of the gastroenemins and solous which we have just described. Narrower and more rounded in the middle than at its extremities, broader at its upper than its lower part, formed of very distinct fibres, it descends vertically behind the lower part of the legwhere it forms a remarkable prominence. It slides over the upper half of the posterior surface of the calcanoning by means of a cartilaginous surface and a synovial capsule, and is insurted into its lower half. It is envered posteriorly by the skin; anteriorly, it is separated from the muscles of the posterior and deep region of the leg by the deep layer of the erural aponeurosis, and by a great quantity of adipose cellular tissue, and receives fleshy fibros from the solem until near the calcaneum. The gastroenemius and solems extend the foot upon the leg, and the leg upon the foot. The gastroenemius by itself can bend the leg and thigh on each other. The section of the gastroenemius will also have

exposed

330. The PLANTARIS (wanting in some subjects,) is extremely slender. Arises by a small tendon, behind the outer condyle of the femur, from the posterior ligament of the knew joint, and from the tendon of the outer hand of the gastrocuemius. It forms behind the joint a small rounded and conical fleshy bundle, which descends obliquely inwards, and, after passing along a space of two or three inches, terminates in a thin and marrow tendon, which passes between the solens and gastrocuemius, and almost the lower fourth of the leg, adheres to the inner side of the tendo Achillis, which it accompanies to the calcaneum, where it is inserted by expanding. Raise up the blood-vessels rautiously from the back of the knee-joint having first examined the articular arteries, and proceed with the dissection of

381. The Pararreus, behind the knee-mint, shore, flat, nearly triangular, arising by a thick and strong tenden, upwards of an inch in length, from the anterior part of a depression that is observed upon the tuberosity of the outer condyle of the femur, beneath the attuchment of the external lateral ligament of the kneejoint. This tendon, which is embraced anteriorly by the synorial membrane of that articulation, adhering to the external semilunar cartilage, is converted into an aponeurosis which desernds for same extent on the fore part of the muscle, and is afterwards concealed among its fleshy fibres. The latter, which are so much the longer and more oblique the lower they are, are directed downwards and inwards, and terminate on the posterior and superior triangular surface of the tibia, on the inner edge of that bone, and on a thin aponeurosis, detached from the temion of the semi-membraness which covers it posteriorly. The protector surface of this muscle is covered by the gastrocnomius and plantaris more s, the popliteal vessels, and the posterior tibial nerve. The anterior is applied upon the articulation of the tibia and fibula, the tibialis posticus muscle, and the tibia. Its outer edge, which is longer than the inner, is connected above by a thin membrane with the upper part of the fibula and the science. This muscle is said to bend the thigh and the leg upon each other, and draws the point of the fint inwards, making the tibia turn upon its axis. Detach the coleus from its tibial and fibular origins; this will expose the following muscles:—*

332. FLEXOR COMMENTS LONGUE DIGITORUM PEors, extended at the back part of the leg and beneath the foot; long, flat broader in the middle than at its extremities, fleshy and simple above, and terminated by four tendons below. It arises from the posterior surface of the tibia, extending from its upper oblique line to its lower fourth, and from an aponeurotic partition which is common to it with the tibialis posticus and flexor longus pollicis From thence its fleshy fibres descend, and are all inserted in succession, upon the sides of a tendon which, toward the lower part of the log, becomes free. The tendon then passes behind the mallealus internus, in a groove common to it and that of the tibialis posticus, from which it is however separated by a fibrous septum, and behind which it is placed. These two tendons are kept down in this place by a retinaculum fixed to the groove of the tibia, the malleolus internus, the astragalus, and under the small tuberosity of the calennoum; internally of this sheath, two distinct synovial capsules are met with, one for each tendon; the whole apparatus is continued under the arch of the calcaneum, where the tendon sinks to advance again obliquely from behind forwards and from within outwards, under the arch of the fout, crossing at first the direction of the flexer longus politicis, under which it lies, and communicating with its tenden by a fibrous slip. There it

[•] Previous to ecommencing the discretion of the three following muscles, the student night to clear the plantar aponeurosis, and even to discret and examine three of the muscles placed immediately above is, viz. the abductor pollicis pedis, the dexic brevia communic, and the abductor minimi digin. Having examined these, he may then return to the examination of the deep muscles of the leg-

broadens, and presents traces of four divisions; here also upon its outer edge it receives the fibres of the Beggr accessories, an account of whose anatomy will be found along with the other muscles in the sule of Farther on, it divides into four tendons, thin and slender compared with the size of the toes to which they belong, which separate from each other, give origin to the lumbricales muscles, issue from above the plantar aponeurosis opposite the articulations of the metatarsal bones and phalanges, enter beneath the toes into a fibrous sheath precisely similar to that of the fingers, (250), which also receives the tendons of the flexor brevis digitorum pedis, pass through the slits in these tendons opposite the middle of the first phalanges, and are attached to the posterior and inferior parts of the third phalanges of the last four toes. In the legthe pasterior surface of this mustle is covered by the soleus muscle, the tibial apeneurosis, and the posterior tibial artery. The outerior covers the tibia and the tibinlis posticus muscle. Its outer edge is connected with that muscle, and with the flexor propries pollicis. In the fout, it is in connexion, by the inferior surface of its tendons, with the adductor pollicis, flexor brevis digitorum, and abductor minimi digiti muscles, and with the plantar nerve; and by the opper surface, with the deepseated muscles of the sole of the foot. Its uses are to bend the three phalanges on each other, and the toes on the metatarsus, and to extend the fact on the leg. It acts much in standing. Detach the muscle at a few points by which it adheres intintately to the next musele, and proceed with its dissection.

883. Tinials Posticia clonguted, flat, much thicker above than below, bifurcated at its upper part to allow a passage to the asterior tibial vessels. The enter and smaller branch of this bifurcation, arises from the inner and back part of the fibula; the other, which is larger, is attached to the oblique line of the tibia, to its posterior surface, and to the intercessous ligament. From thence the muscle descends at first nearly vertically and afterwards a little inwards, encessively receiving fibres which come from an apaneurotic septum, placed between it and the flexor communis digitorum and flexor proprius policie; it increases

in size to its middle part, and diminishes farther down. It forms a tendon which commences high upon its inner and fore side, and which, after becoming free, passes into the groove formed behind the malleolus internus, where it increases much in breadth, to be inserted at the lower and inner part of the os scaphoides, and by a prolongation into the base of the internal cuneiform bone. The portion of this tendon which passes under the head of the astragalus contains a sesamoid bone. The anterior surface of this muscle covers the fibula, the tibia, a large extent of the interosseous ligament, and the inferior calcaneo-scaphold ligament. The posterior surface is covered by the soleus, flexor longus digitorum, and flexor proprius pollicis muscles, and by the malleolar fibrous sheath. It extends the fost upon the leg, raising its inner edge. It also extends the leg upon the foot. This muscle may be left in its place, whilst the next is exposed.

334. FLEXOR LONGUS POLLICIS, fleshy, thick and flattened above, slender and tendinous below, arises from the two lower thirds of the posterior surface of the fibula, from the interesseous ligament, and from two aponeurotic partitions which separate it from the two preceding muscles on the one hand, and on the other from the peroneus longus and peroneus brevis. It descends vertically behind the fibula, becoming larger as far as its middle, and then contracting again-Arrived at the lower part of the leg, it terminates by a tendon at first concealed among its fieshy fibres until opposite the ankle joint. There it becomes nearly horizontal, enters a groove formed behind the inferior extremity of the tibia and the posterior surface of the astragalus, where it is kept down by a ligamentous shenth lined by a symposial bursa, which accompanies it under the arch of the calcancum in a particular depression; it is there placed to the outer side of the tendon of the flexor communis digitorum. This tendon, which was at first bread, becomes narrower as it leaves the fleshy fibres, passes over that of the flexor communis, communicates with it in a variety of ways, sometimes by a positive bifurcation, one division of which proceeds to the second toe, and sometimes by a mere tendinous expansion; next proceeds over the

inner edge of the foot, between the two partions of the flexor brevis policis, passes between the two sesamoid bones of the first articulation of the metatarsal bones and phalanges, opposite which it enlarges, to penetrate into the fibrous sheath of the great me, in which it is enveloped by a synovial membrane. At the entrance of this sheath, it contracts, presents traces of a longitudinal division, and is expanded at its extremity, which is attached to the lower and posterior part of the distal phalma of the great toe. In the leg, the posterior surfore of this muscle is envered by the soleus and the tibial aponeurosis, and the fibular artery passes into its substance, in its course from above downwards. naterior is applied upon the fibula, the tibialis posticus and flexor longus communis muscles, the interesseous ligament and the tibia. Its tendon is surrounded by synovial membranes behind the ankle joint and under the great too, and by the flexor brevis pollicis under the sole of the foot."

The following three muscles will have been already dissected and removed, but a re-examination may be

useful at this stage of the dissection.

335. Anductor (Abductor) Pointers Prots, situated at the inner part of the sole of the four. Arising from the posterior, internal, and inferior part of the calcaneum; from an aponeurotic partition which separates it from the flexor brevis digitorum; from the internal annular ligament of the tarsus, and from the posterior part of the plantar aponeurosis. The fleshy fibres proceed forwards and a little inwards, and are inserted upon the upper surface of a tendon which they conceal for some time, which afterwards appears beneath them. The fleshy fibres of the inner portion of the flexor bravis are intimately united to this tendon, so that they almost uniformly seem to constitute

^{*} It may farther aid the student's revollection of these muscles, to have it pointed out to bim that the muscle, whose tendon proceeds to the great tor, occupies the Sholar or apposite side of the leg; and that the travelle, whose tendons proceed to the small and to the other toes, lies on the tihial side of the legition the tendons of these muscles are respectively successitated to cross each other in the foot, and thus also a good deal of the obliquity of their action is corrected.

but one manele; it is more convenient, however, for the student to consider them as two. The common tendon is ultimately attached to the lower and inner part of the base of the first phalanx of the great toe, adhering strongly to the ligaments by which it is connected with the first metatarsal bone. Its inferior surface covers the plantar aponoussis, to which it intimately adheres behind. The upper surface is covered by the accessories and flexor brevis politics muscles, the tendom of the flexor longus digitorum, flexor longus pollieis, tibialis articus, and tibialis postions, and by the plantar vessels and nerves. It carries the great

toe inwards, and bends it a little.

336. FLEXOR BREVIS DIGITORUM PEDIS PERFORArus, arising from the posterior and inferior part of the calcaneum, between the adductor policis and abductor minimi digiti, from which it is separated by two aponeurotic partitions; from these, as well as from the plantar aponeurosis, some of its fibres also arise; it directs itself forwards, and at the middle of the sole of the foot, divides into four distinct bundles, the inner of which are the largest. These bundles successively cover each other from within outwards, and are each terminated by a tendon, which appears sooner above than below. These tendous advance beneath the heads of the metatarsal bones, pass between the slips of the plantar aponeurosis, are engaged along with those of the flexor longus in the fibrous sheath placed under the toes, solit to allow them to pass, exactly in the same manner as those of the flexor sublimis of the fingers (249), and are inserted, by two slips, upon the sides of the second phalanx of each of the last four toes. Its inferior surface covers the plantar aposeurosis, with which it is intimately connected behind. The upper surface is covered by the lumbricales and accessory muscle of the flexor longus, by the plantar vessels and nerves, and by the tendons of the flexor longus. Its inner ofge is connected posteriorly with the abductor pollicis, from which it is separated anteriorly by the tendon of the flexor longus, and by a portion of the Besor brevis of the great toe. The outer odes is united posteriorly with the abductor minimi flight, and contiguous anteriorly to the flexor brevis

minimi digiti. It bends the second phalanges of the toes upon the first, and these upon the metatarcal bones. It also augments the concavity of the arch of the foot.

337. The Aspector Mixing Digital Penus arises from the inferior surface of the calcangum, on the outside of the flexor brevis digitorum, by short aponeurotic fibres; from a fibrous partition which separates it from the flexor brevis digitorum; from the plantar aponeurosis, and from the posterior extremity of the fifth metatarsal bone, by a tendon, which is continuous with that aponegrosis; from thence, it advances beneath the inferior surface of that bone, diminishing in size; its fibres then terminate successively upon a tendon which is inserted into the outside of the corresponding extremity of the proximal phalanx of the little toe. Its inferior surface covers the plantar aponeurosis, to which it is strongly united behind. The upper is covered by the accessorius muscle, the inferior calcaneo-cuboid ligament, the tendon of the peronens longus, the posterior extremity of the fifth metatarsal hone, and the flexor brevis minimi digiti, which is seen nateriorly between its inner edge and the flexor brevis communis, which is united to it behind. It carries the little too outwards, and hends it a little. Remove these muscles by cutting them through as their origins, and reflecting them from behind forwards; next clean the following muscle if not previously exposed.

338. Muscurus Accessorous, is of a quadrilateral form, flat and thin, arising by means of aponeurotic fibres, and by two distinct bundles, from the lower and inner surfaces of the calcaneum, whence it proceeds forwards and a little inwards, in a horizontal direction. Its fibres, which are all parallel, terminate on the outer and upper part of the tendon of the flexor longus digitorum pedis, near the point where it divides. They frequently present there an aponeurosis prolonged upon their inner edge, while that by which they are attached to the calcaneous is more distinct at their outer edge. Its inferior surface covers the abductor pollicis, flexor brovis digitorum, and abductor minimi digiti, as well as the plantar vessels and nerves. The apper surface is covered by the calcaneum, the inferior and superficial calcaneo-cuboid ligament, and by the extremity of the abductor minimi digiti. This muscle serves as an auxiliary to the flexor longus, and rectifies its obliquity. It used formerly to be called the Massa Carnea Jacobs Sylvii, having been first described by Jaques de la Bois.

339. LUMBBUCALES, are four small muscles extending from the tendons of the flexor longus to the last four toes. The first, which is the longest and largest, arises from the inner edge and upper surface of the flexor tenden of the second toe; the other three, which diminish successively in volume from within outwards, arise from the interval which the four tendons of the flexor longus leave between them at their separation. They all proceed horizontally forwards, diverging a little, and terminate each by a tendon, appearing at first un one of their surfaces, and afterwards becoming isolated, which passes between the slips of the plantar aponeurosis, runs along the inner edge of the last four metatarso-phalangeal articulations, and is at length inserted into the inner and lower part of the base of the first phalans of each of the last toes, sending a thin aponeurosis to their extensor tendon, in the same manuer as in the hand. Their inferior surface covers the plantar apuncurusis. The upper lies beneath the adductor pollicis, transversus pedis, and the interessei plantages. They carry the toes a little inwards, and contribute to bend the first phalanges, and extend the second and third. Having removed these muscles together with the long flexor tendons, the following muscles show themselves.

340. Thansversely beneath the leads of the last four metatarial hones. It is about an inch in breadth, and arises, by distinct and fascienlated aponeurotic fibres, from the ligaments of the last four metatarso-phalangeal articulations; there result from this, four small parallel slips, more distinct behind than before, which unite together, and are attached, along with the adductor policies, to the outer edge of the base of the first phalans of the great toe. Its inferior surface covers the tendons of the fiexer longue and thexer brevis digitorum, the lumbricules, and the collateral nerves and vessels of the toes. The appearance coversponds to the interessel.

This muscle carries the great toe outwards, and brings nearer to each other the heads of the metatarsal bones.

341. FLEXOR BREVIS POLLICIS PEDIS, arises from the anterior and inferior part of the calcaneum, and from the last two conciform hones and their ligaments by a pretty thick tendon, at least an inch in length, which extends nearly over the whole of its upper surface. Several of its fibres also arise from the apparentation which separates it from the abduetor pollicis. They are all short and ablique, and advance a little inwards, forming a hundle which increases in size, presents at its under surface a groove for lodging the tendon of the flexor longus politicis, and divides into two portions, at first united by cellular tissue, and alterwards isolated; the inner unites with the tendon of the abdustor pollicis, terminates along with it at the first phalanx of the great toe, and is moreover attached to the inner sesamoid bone of the articulation, The outer portion, which is thinner, and confounded with the adductor policis, is inserted along with it into the lower and outer part of the base of the first phalanx of the great toe, and the outer sesamoid hone. Its ivferior surface nests upon the tendon of the flexor longue pollicis, the plantar aponeurosis, and the abductor pollicis, with which it is partly confounded. The apper surface has above it the tendon of the peronens longus and the first metatarsal bone. Its owler edge is united anteriorly, with the adductor pollicis. It hends the first phalanx of the great toe upon the first metatarsal hone,

342. Annurron (Addecros) Polliers. Arises from the inferior surface of the os emboides, the ligamentous sheath of the perceneus longus, and the posterior extremity of the third and fourth metatarsal hones, and from the ligaments by which they are connected; it proceeds forwards and inwards, to be attached to the outer and under part of the proximal phalanx of the great toe, and its outer sesamoid bone, by an apparatosis which occupies its inferior surface. Its inferior side covers the flexor longus digitorum, the accessorius muscle, the lumbricales, and the plantar aponeurosis, the tendon of the peroneus longus, and the outer edge of the first metatarsal hone. The outer edge is in con-

nexion with the interessed and external plantar arrery. It carries the great toe outwards, and bends it a little.

343. Freeon Basers Mixing Diotti. Arises from the under part of the posterior extremity of the fifth metatarsal bone, and from the ligamentous sheath of the tendon of the peroneus longus; and is inserted, by aponeurotic fibres appearing upon its under surface, into the lower and unter part of the base of the proximal phalanx of the little toe. Its inferior surface covers the plantar aponeurosis and the abductor minimi digit; the apper is covered by the lifth metatarsal bone, and by the list plantar interesseous muscle. It bends the first phalanx of the little toe. Remove the transversus pedis and

abductor pullicis; this exposes the

344. INTEROSSEI PEDIS; similar in number, form. and disposition to those of the hand (262). Six belong to the three middle toes, and one to the little toe; the great too has none. Four are situated on the back of the foot, and three on the sole. The First Internal Plantar Interosseous Muscle (adductor digiti tertii). Arises from the two lower thirds of the whole inner surface of the third metatarsal bone, and from the ligaments by which it is united inferiorly to the tarsus. Its fleshy fibres are inserted upon the outer surface, and a little upon the inner edge of a tendon which terminates, like those of the preceding muscles, at the inner side of the third toe. The upper side of this muscle is placed between the third metatarsal bone and the abductor of the second toe. The lower side is applied upon the transversus pedis and abductor pollicis. The Second Internal Interosperar Murcle (adductor digiti quarti). Arises from the lower part of the inner surface of the fourth metatarsal hone, and from the ligaments by which it is connected with the tarsus; its tendon is inserted upon the inner side of the fourth tue. The Third Internal Internations Muscle (adductor quinti digiti), arises a little from the fibrous sheath of the perqueus longue, and from the two inferior thirds of the inner surface of the fifth metatarsal bone, and terminates on the inner surface of the fifth too, by a tendon which the fleshy filtres accompany as far as the articulation. The student will remark in regard to those interceses. that they lie rather in the hollow of the bones, than between them, and that they arise each from a single metatarsal bone.

345. The Donsar Inverosser arise each from two metatarsal bones. The first dorsal interospous muscle (adductor digiti secondi), is the largest of the interossei of the foot; its form is that of a triangular prism. It arises from the whole extremity of the inner side of the second metatarsal bone, and from the outer side of the posterior extremity of the first. The latter portion is separated from the first by an interval in which the anterior tibial artery passes. Its fleshy fibres are attached to the two sides of a tendon concealed in their substance, and which they accompany to the extremity of the metatarsus; this tendon is partly inserted into the inner side of the base of the first phalanx of the second tor, and partly upon the corresponding extenser tendon. Its upper surface is covered by the skin. The inferior corresponds to the adductor pullicis; and its sides are applied upon the first two metatarsal bottes. The record durant internations muscle (abductor digital accords), arises from the whole outer side of the second metatarsal bone, and from the upper part of the inner side of the third; it is terminated by a tendon, which has the same insertions on the outer side of the second toe, as the adductor on the inner. Its apper surface is corcred by the skin, by a thin aponeurous which goes from the second to the third memarsal bone, and by the extensor tendons of the toes. The lower surface corresponds to the adductor pollicis. The third durant internacious muzele (abductor digiti tertii), arises from the whole outer side of the third metatarsal bone, from the upper part of the inner side of the fourth, and from the ligaments by which they are united, and terminates by a tendon precisely similar to those of the other interossej. Its upper surface is covered by an apaneurosis which goes from the third to the fourth metatarsal bone. The haver covers the transversus pedis and the tendans of the flexor muscles, Thu finrth durant interasseous waterle (abductor digiti quarti), arises above from the mor origo of the fifth metatarsal bone, and from the a lade outer surface of the fourth, and terminates on the mater side of the fourth too.

2010. The student may re-examine advantagement

the course of the principal arteries, voins, and nerves which occur in the posterior region of the leg, and in the sole of the foot. As they are, generally speaking, continuous, they and better be examined together. The popliteal arrory having given off the anterior tibial, near the inferior margin of the poplitous muscle, divides into two branches, the fibular and posterior tibial. Of these the posterior tibial is usually the larger. The fibular proceeds outwards and downwards, along the posterior surface of the fibula, and is soon concealed by the flexor propries policies. A short way above the mall-olus externus, the artery divides into two branches, the anterior fibular and the posterior. The former has been already traced; the latter descends behind the maliculus externus to the heel. Deep veins accompany this artery : these join the popliteal. The posterior tibial artery follows the direction of the popliteal; it passes first in front of the soleus, and behind the tilitalis posticus and flexor communis, to the hollow between the calcaneum and malleolus externus. It here subdivides into internal and external plantar arteries-Pravious to this it has given off many muscular branches, but it is sometimes very small, or even wanting. The internal plantar artery, the smaller of the two, chiefly supplies the muscles and soft parts on the inner side of the foot. The external, on the contrary, is the important branch; it crosses from the inner to the outer sideof the foot, above the first layer of plantar muscles, asan arch of arteries, from which arise the vessels supplying the toes. In its course it becomes comparatively superficial opposite to the praximal end of the fifth meantarsal home, and lying in the line of the external purtition; but it recrosses the fact very deep, and at last unites with the anterior tibial between the two headsof the first darsal interesseal muscle. Deep veins accompany all these arteries. Thenerves in this region are the posterior tibial and plantar; these follow pretty closely the general course of the arteries.

PART VII.

DISSECTION OF THE ABDOMEN-

347. CAVITIES OF THE ARDOMEN AND PRIVIS.-These form but one great cavity internally, as may be observed by an inspection of the skeleton, and they must always be dissected together, both in the male and female subject. We shall first describe the male abdomen, noticing afterwards, in a separate section, the pecultarities of the female and of the fessus. The abdomen contains most of the principal viscera of the body, and is divided into several regions. Its walls, or containing parts, come to be considered first; and their dissection should be commenced on the back, where the student will find the long and other muscles of the back shutting in this cavity in the lumbar region, and filling the vacant space which he will observe in the skeleton between the spine, last tihs, and crest of the ilium. The description of these muscles and other soft parts he will find at 159; and the student had better turn to these at once, and dissect them accordingly. So soon as this preliminary step to the right understanding of the abdominal walls is done, let the subject be now laid on its back, with a block under the loins, so as to put the anterior and lateral parts of the walls of the abdomen onthe stretch. Make an incision through the integuments only from the ensiform process of the sternum to the symplexic puber, noting the ambilious which lies in the course of this incision, and measuring its distance from the publis and sternum,-a second invision from the summit of the crest of the ilium, across the abdomen, to meet the former vertical one at right augles,and a third from a few inches above the umbilions, outwards and upwards, towards the axilla, but keeping about a hand's-breadth below this region. Dissert uil' these flaps of skin merely, taking care to leave throughout the whole extent of the dissection the subcutanoous cellular membrane, which here gets the name of

348. The Superficial Arbuminal Fascia. To examine and understand this fascia properly, dissect the integuments downwards from off the upper surface of the thigh, for about two inches; but this can only be done with the permission of the student who may at the same time be examining the lower extremity of the corresponding side. The subject being male, prolong the incision through the integuments nearly to the extremity of the penis, and another downwards, quite to the bottom of the scrolust; (if a female subject, those incisions may be prolonged into the greater labinm of the corresponding side). The superficial farcia is a layer of adipose cellular membrane, continuous every where with the investing cellular membrane of the hody. It is connected to the integuments which lie above it by numerous vessels, nerves, and prolongations of its own substance; where covering the abdomen, it is called the superficial fascia of the abdomen, and as it extends over Poupart's ligament into the inguinal region of the thigh uninterruptedly, it there gets the name of the superficial fascia of the thigh. However loaded with fat where it lies on the abdominal walls, its adipose portion suddenly ceases at the root of the penis, but the condensed cellular layer which is continued over this organ is called the sheath of the penis; its descent into the scrotum is quite evident, and here likewise it lays aside its adipose tissue, and assuming a fibrous, and in some subjects even a muscular character, it here gets the name of dartor. (Some anatomists consider the dartos and superficial tascia as distinct, but this view renders the matter unnecessarily complex.) Imbedded in this fascia the student will observe the superficial apigustric artery, circumflex of the ileum, and their accompanying reins; these arteries proceed from below upwards, as they come from the common femoral artery. but their origins cannot be seen at present. To examine the texture and connexions of this important fascia, let the student next make an incision through it from the crest of the ilium, or anterior superior spins of that bone, towards the umbilious, and a second from the umbilious to the pubes, extending along the dorsum

of the penis. As he raises up the fascia from off the abdominal muscles, and then the tendons, he will observe it to be composed of several layers, easily apparable with the knife, if necessary; but the dissector had better not do this, as it will embagrass him in his future surgical views of these parts. The texture of the fascinis firm and almost elastic in some subjects, extremely dense, close, and thin; in others of great thickness, being loaded with fat. Beneath the fiscis, as he gradually removes it, he will find a layer of cellular substance consurting it with the subjected parts, which may be left or removed along with the fascia; but if he removes it along with the fascia, he must be very careful in nating the manner in which it connects the fascia with the subjacent parts. As he continues to take off the fascia, proceeding from above downwards, he will find that it forms at the root of the penis the suspensory ligament of that organ, which is here intimately connected to the linea alba; it next covers the spermatic chord and inguinal ring. On its way down into the scrotum, and as it passes over Poupart's ligament to the thigh. the cellular substance which connects it to Poupart's ligament, has been improperly called Scarpa's fascia, a name adopted as the result of some pathological dissections made by that distinguished surgeon and anatomist. The superficial fascia may now be traced into the thigh. It here covers the fascia fata, both on its iliae and pubic portions, the inguinal lymphatic glands, some of which lie imbedded in it, and is intimately incorporated with the cribriform fascia, already described. Lastly, it extends into the perineum, where it constitutes the superficial fascio of that region, ashering pretty firmly to the rami and tuberosities of the ischlum. The student may now pay attention to those superficial arteries to which we formerly alluded : the ar. circum. uris, illi externo, epigastrii ex. and pudica ex.; these some from the femoral artery, and ascend over the erural arch, (also named Poupurt's ligament-ligament of Fallopio), lying imhedded in the superficial fascia, and ramifying thirdy in the skin. The ex. eircomilex. proceeds in the direction of the spine of the flinm, the epigastric towards the umbilicus, and the padic towards the organs of generation; the accompanying voins are

usually small, but have been known to become exceedingly varieose. The uses of the superficial fascia are to support the abdominal walls, besides forming an integral part of the great investing cellular membrane of

the whole body.

349. External Oblique (obliques abdominis exterans) .- In cleaning this muscle, which must be done by dissecting in the course of its fibres, the student had better remove along with the superficial fascia, the thin cellular layer which immediately invests the muscular and tendinous fibres; this is the proper famin of the musele, and is often confounded with the superficial fascia, giving rise to difficulties and disputes; it is quite distinct from it, and serves a totally different purpose, belonging in an especial manner to the muscle itself; and unless carefully removed, along with the superficial fascia, the muscle can scarcely be cleaned afterwards. Moreover, at the edges of the hypochendria, and close to the sternum, great care must be taken not to remove the tendon of the external oblique itself, which is here extremely thin. The extremal oblique, like the internal and transverse muscles, which lie below it, is formed of two great portions, a fleshy and a tendinans. On the Continent, it has been usual to describe the tendinous portions of these muscles as a great abdominal aponeurusis, quite distinct from the fleshy portion. This view, though correct and practical, has not been generally adopted in this country, and as it has un peculiar advantages over the other, we do not mean to insist on it here. The external oblique muscle of the abdomen arises by fleshy slips from the lower edge of the fifth and sixth ribs, where they seem to join the pectoralis major; from the outer surface of the seventh, eighth, and ninth rits; and from the inferior edge of the tenth, eleventh, and twelfth, by digitations, covered by those of the latissimus dorsi, with which they are interlaced. The digitations connected with the seventh, eighth, and ninth ribs are interlaced with those of the serratus magnus; these fleshy digitations lie upon the outer surface of the ribs, their cartilages, and the intercostal muscles; they form together a curved line, the concavity of which is turned downwards and forwards, and the convexity upwards and

backwards. From these origins the fleshy fibres proored in a direction generally downwards and forwards. to be inserted chiefly into an expanded tendon, constituting the external layer of the great abdominal apuneurosis of the French writers and surgoons; but, secondly, a great number of the filtres are inserted into the two anterior thirds of the noter lip of the crest of the illium. The use of the muscle is to compress the abdomen, and by depressing and carrying the ribs backwards, it acts in strong inspiration, and likewise makes the thorax perform a rotatory motion, which turns it to the opposite side; it draws up the trunk when it has been bent backwards, or maintains it in its erect position; when the two museles act together, they bend the thorax forward; when lying on the back, these muscles raise the pelvis and inferior extremity, and they also assist in the evacuation of the urine and forces. This muscle covers partiens of the ribs and their cartilages, and of the intercostal muscles, and the internal oblique muscle; its tendon covers many important parts, but it had better be examined separately.

350 ABDOMENAL APONEUROSIS. The broad tendon in which the external oblique muscle ends occupies, with its fellow of the opposite side, nearly all the anterior and lower part of the abdomen, from the sternum and over the hypochondria to the pubes, and from the anterior and superior spinous process of one iliam to that of the opposite side. It is broad inferiorly, narrow about the middle, in the situation of the umbilious, and somewhat broader in the epigastric region as it ascends; it unites intimately with its fellow of the opposite side along the middle plain of the abdomen, and assists in forming, by uniting with the subjacent tendons, a strong tendinous chord, called the lives albo; in this line occurs the opening of the umbilious, through which passed in the Retus the umbilical arteries, the umbilical vein, and prohably the urachus. It is in this line that surgeons nuncture the abdomen in the dropsy, called ascites; the urinary bladder may be punetured, also in the lines alba, or even out into, for the removal of stone from it. The tenden of the external obique musele is fixed to the ensiform process of the

sternum, and along the lines allo, to the tendon of the opposite side, also to the crest of the dium, to the spine of the pubes, and to the sympleysis publs, where its filters deminate with those of the opposite side. The part of the tendon which extends from the anterior superior spinous process of the ilima to the spine of the pubes, is called the crural area, Poupert's ligament, &c. The portion attached to the spine of the pubes is called the external pillar of the outer abdominal ring, the parties attached to the symphysis pubis is called the inner or upper pillar of the ring; the triangular shaped space between these pillars is called the external abdominal ring, although it be not at all circular. To expanse the aperture, the student must cut through a thin layer of a fascia, at times cellular, but approaching at other times the fibrous character, extending from the edges of the pillar, and from the surface of the abdominal aponeurosis, a short distance upwards and downwards over the spermatic chord towards the scrotum, this is called the inter-columnar facia; and on being divided, the finger or a director may readily be introduced into the aperture, leading upwards and outwards beneath the tendon of the external oblique muscle. The space into which the finger will thus be introduced is termed the inquinal canal, and the aperture itself is the external abdominal ring. It is of a triangular form, the base being at the pubis, the spex opwards and outwards; the lateral margins are the pillars or columns already described. The chord passing through the aperture is the spermatic chord; the muscular fibre accompanying it is the cremater muscle; the aperture is much larger generally in the male than in the female, in whom there passes only by this aperture the round ligament of the uterus. All those parts will be examined more carefully at a future stage of the dissection. Let the student next turn his attention to Povpurf's ligament. This ligament, most frequently called the crural arch, is now usually considered merely as the inferior murgin of the broad tendon of the external oblique muscle. It is strong and tense, when the limb is stretched and the toes turned out; but it may be greatly relaxed by bending the thigh and rotating the limb, at the same

time turning the toes inwards. The effect of this is to relax the aperture or abdominal ring, and to facilitate the reduction of hernia. Viewed as a part distinct from the tendon of the external oblique, although it be not so, it is usually described as extending from the anterior superior spinous process of the Heum to the spine of the pubis; its insertion into this part is called the outer pillar of the ring : it has, however, a deeper insertion, which cannot be readily examined at this stage of the dissection, being best seen after the cavity of the abdomen has been laid open; it abould therefore be examined upon a preparation. This insertion is usually called the ligament of Gimbernat, although it is doubtful if it be precisely the part to which Gimhernat alluded in his coarse description of these parts. It is broad, triangular, and presents a erescent-shaped form looking towards the femoral vein or outwards: its base is attucked to the commencement of the linea ilea pectinea, which in this place is not unfrequently raised into a prominent crest; the anatomy of Gimbernat's ligament is peculiarly concerned in the anatomy of the crural herain, as it forms the inner margin of the superior aperture of the erural must, by which femoral hernia descends into the upper part of the thigh, and is the part, which, together with the neck of the sac, requires to be cut in the operation for strangulated crural bernia. This insertion of the crural arch has, mursover, been supposed by Dr. Monro. to be broader in the male than in the female; this opinion however is erroneous. The direction and connections of Poupart's ligament merit particular attention. Commencing with the anterior superior spinous process, it at first descends inwards and downwards towards the middle of the thigh, and is throughout this, its outer half nearly, intimately connected to the fascia lata. It is this intimate union with the fascia hata, which renders it tense when the limb is extended and the toes everted. From this point Poupart's lignment changes its direction somewhat, and proceeds unwards and inwards, to be fixed into the spine of the nulses. This inner half is more of a rounded form, and forms a sort of caunt internally, in which is purtially lodged the spermatic cord and cremaster muscle.

The connections of this inner half of the crural arch are more particularly with the fascia transversalis and fascia lata (which the student has not yet examined as this stage of the dissection), and but little with the fascia lata, excepting close to the spine of the pubis, The crural arch is thus strotched over a great number of important parts : these are, the ilineus musels, the anterior crural nerve, the psoas magnus muscle, the common femoral artery and vein, the top of the pentinous muscle, and the crural bernia, when present-When the epigastric and circumflex artery of the ileum arise rather lower than usual, the crural arch is also stretched over these. In the great tendon of the external oblique muscle thus described, there are many small apertures for the passage of blood-vessels. The fibres composing its intimate structure run in two directions, and in two layers; the more numerous from above downwards, in the direction of the muscular fibres; the others transversely, and in a sweeping semi-circular direction; these are chiefly found inferiorly, towards the apex of the external abdominal ring, and are often continuous with the intercolumnar fascia already described. But this fascia is not derived solely from these fibres.

351. INTERNAL OBLIQUE, (Oldiquuz Internas ar Ascendess,) To expose this muscle, remove the external oblique by an invision carried through its costal origins, leaving about half an inch of each attached to the ribs; next detach the part of the muscle fixed to the crest of the ilium, and carry an incision across its tendon, as far as possible towards the linea albo, beginning at the anterior and superior spinous process of the Hum. Reflect the lower part of the tenden towards the thigh, and by this means expose the inguinal canal, cremaster muscle, and spermatic cord; and remove the remaining portion from the ribs, the intercostal unuscles, and the internal oblique, taking care as much as possible to clean the fibres of the internal oblique, whilst the external is being removed. Poupart's ligament must be left untouched for a time. The obliques internes is broad, thin, and irregularly quadrilateral, attached to the upper and posterior part of the crural arch to near the inguinal ring, to the

three anterior fourths of the interstice of the iliae creat, between the obliques externes and transversus muscles, and to a thin and broad fascia, which some think to be the lumbar fascia, and others reckon a distinct aponeurosis, with fibres running obliquely outwards and upwards, situated behind the inferior bundle of the sacro-lumbalis muscle, and before the aponeurosis of the latissimus dorse, from which it cannot easily be separated, continuous also above with that of the secratus posticus inferior, and attached to the last spinous propesses of the loins, to the sacrum, and to the most remote part of the iliac crest. The fleshy fibres which succeed this aponeurosis are not numerous; they ascend almost vertically, and terminate by short apprneuroses, at the lower edge of the curtilage of the last Those which have their origin from the crost of of the ileum, pass obliquely apwards and forwards, and their obliquity, as well as length, increases the more anteriorly they are examined, so that when close to the superior and anterior spinous process of the ileum, they are almost horizontal. The posterior fibres terminate by short aponeuroses, at the lower edge of the eartilages of the eleventh, tenth, and ninth ribs, where they are united with the intercostal muscles in their interval; and the others are distributed along a tendon, called by the French writers the middle layer of the abdominal aponeurosis. Lastly, the fleshy fibres which rise from the crural arch, descend inwards, and also terminate in the same tendon. About eight lines from the summit of the inguinal ring, the spermatic cord passes under them, and is accompanied through the ring by some of their fibres, under the name of crematter secorle. This disposition is observed only in the male. The internal oblique is covered in its outer surface by the external oblique, and posteriorly by the latissimus dursi. Its inver surface is applied chiefly upon the transversus abdominis. In the female generally, the internal oblique presents a distinct free margin posteriorly; in the male this margin is generally very short, hence has arisen the idea that the internal oblique, like the transversalis, runs to the spinal column, and has no free margin posteriorly; this notion is however an incorrect one. The broad

tendon in which most of the fibres of this muscle terminate may now be traced. Near its commencement, it forms the linea similararis, which may be readily enough traced in some persons, just outside the edge of the rectus muscle. Here the tendon divides into law lawing, to enclose the rectus, and to form its sheath.

352. Sheath of the Recti Muscles. To understand this mechanism properly, lay open the sheath of the rectus by an incision carried down its centre, over the surface of the rectus, from about the fifth or sixth rib nearly to the symphysis of the pubis, and reflect the fibrous sheath outwards and inwards, cleaning the rectus and pyramidalis, exposing at the same the linea transverses. It will now be distinctly observed that the tendon of the obliquus internus divides at the linea semilunaris into two layers, an external and an internal, the external passing in front of the rectes to the lines alba, inseparably united with the tendon of the external oblique; the internal passing behind the rectus, but also to the linea alba, and inseparably united to the tendon of the transversalis abdominis. these tendous run to the symphysis puhis, and are here called the conjoined tendons. They thus assist in forming a portion of the posterior wall of the inguinal canal, and it is here that they are not unfrequently strengthened by a small triangular fascia, railed by some triangular ligament, which however is by no means a constant structure. Some consider the triangular ligament as being more particularly connected with the ligament of Gimbernat, and Ponpart's ligament: I have not observed it to be so. Much individual variety prevails at this particular part of the conjuined tendons, and hence the multiplied descriptions of anatomists and surgeons; in some persons this portion of the conjoined tendons is strong, in others very weak, with partial deficiencies in it : these persons are much subject to direct hernia. The spermatic cord somewhat overlaps the conjoined tendons, just as it is about to pass through the external abdominal ring, and this, which is a plain enough fact, but not a practical one, has tended greatly to embarrass the student; the part of the conjoined tendons we have just alluded

to is situated immediately behind the external abdominal ring. The anterior lamina of the sheath is composed of two lamings above, and three below. The posterior, which is entirely wanting below, has only two. This will be understood so soon as the muscle has been examined.

353. The RECTUS ARDOMIND, long, flat, and broader above than below, extended vertically, like a fleshy band, on each side of the linea alba, from the pubes to the base of the thorax, and contained in the fibrous sheath, formed in the manner just described. The rectus muscle arises by two tendons which are attached to the symphysis of the pubes, and rarely to the bone itself. One of these, the internal, is slender, and interlaced with that of the opposite side in the median line; the other, which is external, broader and stronger, comes from the outer part of the upper edge of the symphysis. Both ascend converging, and soon unite to give rise to the fleshy fibres. These ascend vertically towards the thorax, but are interrupted from space to space, in their passage, by aponearotic intersections, (linear transversar.) varying from three to five. Their anterior part is more distinct than the posterior, and adheres intimately to the lamina of the abdominal aponeurosis which forms the anterior wall of the sheath : the muscular fibres which arise from an inferior intersection, do not all terminate in that which is placed immediately above, but that a great number of them pass behind it without being interropted, and on to a more The rectus abdominis divides at remote intersection: the base of the thorax into three portions, the inner of which is attached to the costo-xiphoid ligoment, and to the lower and fore part of the eartilage of the seventhrib, near the sternum; the middle is attached to the lower edge and anterior surface of the eartilage of the sixth rib, near its middle; and the outer terminates at the lower edge of the cartilage of the fifth, by distinct aponeurotic fibres. The auterior surface of this muscle is covered above by the aponeurous of the pectoralis major, and in the rest of its extent, by the anterior lamina of the abdominal aponeurosis, which we have just alown to be double above and triple below, excepting

at its lowest part, where the pyramidalis muscle is commonly met with. The paterior surface covers the cartilages of the last three sternal ribs, part of those of the first two a-sternal, the ensiform cartilage, the posterior lamina of the abdominal appropriosis, the internal manmary and epignatic arteries, and inferiorly, the peritoneum, and acturding to some, the facin transversalis. The rectas muscle bends the thorax upon the pelvis, or the pelvis upon the thorax. It compresses the abdomen from before backwards.

354. Pynamidalis, elongated, rounded, triangular bundle, placed in the median line of the body, at the lower and fore part of the rectus, arising from the symphysis of the pubes, and from a little of the neighbouring part of the bone, by short aponourotic fibres, which ascend converging toward each other, being only separated by the lines albs, in which they terminate by a slender and elongated tenden. The inner fibres are vertical, and shorter than the outer, which are oblique. Divide the rectus and verify the fact (349) that its fibrous sheath is deficient behind and below for about a hand-breadth above the pubes; the posterior layer however of the tendon of the internal oblique and the transversalis tendon, which together form the posterior part of the sheath of the rectus, do not generally stop together; the layer of the internal oblique becomes generally deficient first, and the tendon of the transversalis usually proceeds a good way farther down. Within the sheath may also be observed the epigastrie vessels.

235. Carmanera Muscle. The history of the Cremuster properly belongs to the description of the scrotum; as we require to return to it in that section of the work, we shall describe it very briefly here. The Cremuster was first correctly described by Mr. Jules Cloquet. It is thin and in a great measure a continuation of the fibres of the obliques abdominis internas, which are attached to the america and superior line spine. However it also receives some fibres from the transversus muscle, and is in part attached to the inner surface of Pospart's figament near the inguinal ring, and to the neighbouring region of the pubes. Arising from these different points, its fisciculi collect towards the ring, form a small mass at the nater side of the sheath of the spermatic cord and pass outwards. They then separate and expand upon the cord; some fibres disappear entirely in the scrotom, but the greater number return in concentric circles to the pubis and to the other origins of the muscles as was first distinctly shown by Mr. Jules Cloquet. This muscle supports the testicle, and impresses upon it slight motions from beneath upwards during the act of copulation. Detach the internal oblique cautiously, and at all points from the transversalis muscle which it covers, and proceed to clear this muscle,

356. Transverse Muscle of the Arduhrs brins superiorly from the inner surface of the cartilages of the sixth, seventh, eighth, ninth, and tenth ribs, by digitations which are interfaced with those of the displeages; the greater part of the lower edge of the eleventh and twelfth. by very distinct tendinous fibres; inferiorly, from the three anterior fourths of the inner lip of the crest of the ileum to the inside of the obliques internes, and from the two outer thirds of the crural arch, by short appropuration fibres; mesially, its fleshy fibres arise from an oponeurosis which proceeds backwards, dividing into three laminse; the autoriar passes before the quadratus lumburum to be attached to the blass of the transverse processes of the lumbar vertebrus; the middle lamina gliden behind this muscle, before the common origin of the sacro-fumbalia and longissimus dorsi, to terminate at the summit of the same processes; the third is united with the aponeurosis of the obliquus internus, and inserted into the summits of the spinous processes of the loins. From these different points of attachment, the fieshy fibres proceed horizontally forwards and inwards, form a broad tendon which proceeds to the lines, alba, forming a portion of the sheath of the recti in the manner already described. In use the transversalis is aimilar to the oblique muscles, but probably acts more

Inferiorly, the internal oblique and transversalis even inteparably mingled together; should this be the case, it is safer to leave a small portion of the internal oblique than to risk detaching the transversalis.

powerfully. The transversalis muscle covers the fascia transversalis; beneath its inferior margin there passes the spermatic cord. The muscle must now be very cautiously dissected off, and this will expose the

357. FASCIA TRANSVERSALIS. This important fascia is placed on the peritoneum; it extends upwards to the diaphragm, inwards to the linea alba behind the recti, and is more firmly attached to the crest of the ileum and to the greater part of Poupart's ligament; it thus contributes mainly to form the posterior wall of the inguinal canal. It will be afterwards shown when the abdomen has been opened, that the fascia transversalis is continued across the ilineus and paous muscles, and thus becomes the facia iliara. Moreover although it were to terminate inferiorly by being inserted into Poupart's ligament, this termination is more apparent than real. The adequeed student may satisfy himself of this fact by cutting away Pospart's ligament entirely, when he will find the fascia transversalis still running down behind it to take a firm hold of the fiscia lata; the fact is carious anatomically, but we do not think that it leads to any important practical conclusion. The use of the fascia transversalis must be to strengthen the lower parts of the abdomen. About midway between the anterior superior spine of the ileum and symphysis pubis, is an opening of a square shape, the internal or deep abdominal ring, through which passes the spermatic cord in the male and the round ligament of the uterus in the female. The edges of this opening are shut in by a layer of cellular substance which follows the cord, and which must be cut through before the deep ring can be properly understood or the spermatic cord traced through it. This layer of cellular substance is called the infundibuliform fascia and forms the fascia propria of oblique inguinal hernia when that disease is present. It is derived from two sources; 1st, From the edges of the deep ring; 2d, From the outside of the peritoneum, which membrane may be seen so soon as the infundibuliform fascia has been opened. Let the student now examine this opening in the fascin transversaling it presents three margins, an external, an internal, and a superior margin ; it is the superior only which can be

cat with safety in cases of strangulated inguinal hernia; for upon the inner margin or pillar he will observe the epigastric artery and rein or veins which forbid incisions in this direction. The nater margin might be also safely cut if the diagnosis was certain, but this can sel-

dom or never be the case.

358. INGUINAL CANAL AND 198 CONTENTS. Its course is from above downwards and from within outwards (its limits are the internal and external abdominal rings; its boundaries are, anteriorly, the tendon of the external oblique; inferiorly, Poupart's ligament, and its junction with the fascin transversalis; posteriorly, the fascia transversalis and a small part of the conjoined tendons of the internal oblique and transversalis muscles; superiorly, the inferior margins of these same muscles, shut it in by their cellular attachment to the inner surface of the tendon of the external oblique. The obliquity of the canal and the want of coincidence between the abdominal rings contribute no doubt to rensler hernialess frequent than it would otherwise be. These rings being larger in man than in woman renders the inguinal hernia most frequent in him, whilst the contrary has been observed in respect to crural hernia. Of the normal contents of the inguinal canal, it will be sufficient at present merely to say that they consist, P., Of the genital branch of the genito-crural nerve, 2°. A small branch of the epigastric, 31. The premaster musele, 4". The spermatic conl properly so called ; this will be more particularly examined afterwards. Of the assemal contents of the exual, the direct and indirect loguinal hernia chiefly interest the student, because nearly the whole considerations here bear on these surgical diseases. The oblique or intirect inguinal heroia is when the bowels, (whatever they may be,) pass through the deep abdominal ring, (spermatic opening in the fascia transversalis) pushing the peritoneum before them so as to form a sac or covering. They generally do not remain in this opening, but make their way dawnwards and inwards along the inquinal capal, to pass out not unfrequently by the external abdominal ring (spermatic opening in the tendon of the external ablique) and following the course of the cord may ultimately pass quite down into the scrotum. At other times, the bernia which in this case is called a direct or internal inquinal bernia, protrudes through the conjoined tendons immediately behind the internal abdominal ring, thus placing the epigastric artery upon its iliae side, whereas in the indirect inguinal hernia that artery lay upon its pubic side. The danger of confounding these cases is sometimes very great, and hence has arisen the practice of directing the deep incision required to be made in operating for strangulated bernia, always upwards. The student nught here to be informed, in order to render the following remarks intelligible to him, that the object the surgeon has in view in cases of hernia, is to replace the bowels within the cavity of the abdomen which may be done by the taxis, that is mere manipulation without cutting; but if that hals, he must have recourse to the operation for straugulated hernia; that is he must generally out into the hernial sac, and finding out the part by which its tightmess prevents the return of the bowels, divide it, and thus be enabled to replace them within the eavity of the abdomen. The following remarks may serve to connect the anatomical facts with the pathology of the canal. In Oblique Inquinal Hernia, the hernial sac with its contents, pass first through the deep ring, next into the inguinal canal, and lastly, not unfrequently, through the external abdominal ring downwards into the scrotum. The coverings of this form of hernia will then be somewhat different according to the extent to which it may have passed outwards. It is always to be remembered that the cremaster muscle is external to the sac, and the epigastric artery lies upon the pubic side of the hernia as it leaves the abdomen by the deep abdominal ring. In the inguinal canal, the spermatic vessels are behind the sac and its contents; the inferior margins of the internal oblique and transversalis are superiorly close over the neck of the sac. When the soc of the hernia has passed the ring of the tendon of the external oblique, it is usually covered by the following parts; 1st, The integuments; 2d, The superficial fascia; fld, The inter-columnar fascia; 4th, The cremaster | 5th, The fascia propria. The course of the

egigastric artery and its vein or veins will be described in its proper place; the only part of the artery which can interest the student here, is where it lies on the inner pillar of the deep ring. On the other hand, the direct or ventro-inguinal hernia, called also by some interval, protrudes through the walls of the abdomen. to the pubic side of the epigastric artery, through the conjoined tendous, and almost directly behind the external abdominal ring, so that it occupies but very little, if any, of the inguinal canal. It has been found difficult in practice to discriminate this kind of hernia from the indirect; the epigastric artery is placed on the ilian side of the neck of the sac; the cremaster does not usually cover it, and I have not observed any tendinous expansion of the conjoined tendons covering the sucbut it is not improbable that this may occasionally be To avoid confusion, it has been judged preferable to delay the consideration of the central bernia until the pelvis be examined.

359. Cavrry of the Aspones. Carry an incision through the walls of this great cavity, communeing at the ensiform process of the sternum to about the umbilieus, and one on each side from this point to the anterior and superior spine of the ileum; reflect the flaps, and display the organs of digestion, which occupy the greater part of the cavity thus laid open. To facilitate description, anatomical writers for many hundred years have divided the envity of the abdomen into regions. by ideal lines drawn across it, in the following direc-Two lines are drawn transversely between the extremities of the cartilages of the minth ribs, and anterior spinous processes of the ileum; these divide the whole surface into three great regions, viz. the epigastrie, umbiliest, and the hypogastric. Let two vertical lines he now drawn from the cartilages of these ribs to the anterior spines of the ileum; this subdivides each into three regions; viz, superiorly the right and left hypochondria and the proper epigastrium; in the middie the umbilical, and laterally the lumbar regions; inferiorly in the middle the hypogastrium proper, and laterally the iline regions. Many of these regions may be still farther subdivided, and this has been done to a very

great, and perhaps altogether unnecessary extent, by systematic writers on surgical anatomy. Previous to proceeding further with the inspection of the contents of the abdomen, replace the lower flap again in its natural position, and distending the urinary bladder, by blowing air into it through the urethra, dissect the remaining portions of muscles from off the outer surface of the two lower flaps; this will expose the external surface of a portion of the peritoneum (its fixed or cel-Iular surface,) and upon it three cords, viz. two lateral and one mesial. The lateral cords are the remains of the obliterated umbilical arteries, the mesial one is the obliterated urachus; all these structures have a reference to the original feetal condition of the individual. If the flap be now laid down again, it will be seen that, in some subjects particularly the cords just described, project inwards, although placed on the external surface of the peritoneum, and by their projections, and the weakness of the abdominal walls, they cause the formation in many subjects of pouches, which are of course two on each side. Of these pouches, one will be found to correspond to that weak point in the abdominal walls, (the internal or deep abdominal ring), and the other will correspond to the superior aperture of the crural canal, situated just below Poupart's ligament, and to the outside of Gimbernat's ligament. These pouches, by their extent, not unfrequently resemble heraial sacs. A third pouch may sometimes be observed corresponding to the situation of the direct or ventro-inguinal hernia.

360. When a penetrating opening, whether large or small, is made through the walls of the abdomen, and the finger or hand passed in between the walls and the viscera, it passes not only into the cavity of the abdomen, but into that of the peritoneum. It is in this space, which the student now sees fully haid open, that fluids collect in dropsies (ascites), &c. The peritoneum, a smooth shining serous membrane of great extent, not only invests the walls of the abdomen, but covers more or less must sof the viscera which are now seen shining through it. With the hand the student may now examine the boundaries of the abdominal cavity, bound an-

teriorly and laterally by the abdominal muscles just described : superiorly by the disphragm, inferiorly continuous with the pelvis : posteriorly large muscles, together with the spine, shot it in ; these will be seen after the viscera have been recoved. The viscera which are seen in site, are portions of the liver, and its suspensory ligament, stomach, large omentom, small omentum, large intestines, small intestines, bladder if distended; the abdomou contains many more parts, but

these cannot be seen at present.

361. Pentranecu. Although some prefer examining the viscera first, this would require the student to have the command of another abdomen, which might not be convenient at the time. The peritoneum is a shut sac in the male, but two openings open into it in the female. It is thin and translucid, has a very complicated course, invests the inner surface of the walls of the abdomen, forms several more or less marked folds in that cavity, and is prolonged, under the form of an envelope, over most of the viscera which are contained in the abdomen, and which belong to the organs of digestion, of secretion, and generation. It is not unusual to call that part of the peritoneum lining the walls of the abdomen, its periotal portion, and that investing the viscera its visceral portion, but the distinction is not very practical, and of but little importance. In the male, the peritoneum represents, like all serous membranes, a sac, without aperture, whose internal surface, is to appearance smooth, but in reality covered with very fine villesities, muistened with serous fluid, and every where in contact with itself. In the female it is perforated with an aperture opposite the fimbriated extremity of each Fallopian tube, with the mucous meanbrane of which it seems to be continuous. Next trace with the hand the peritoneum as it invests the umbilical portion of the abdominal cavity and its viscera. It lines the posterior part of the linea albu, closes the proterior orifice of the ambilious, and adheres around that aperture, to the abdominal aponeurosis. From thenev. the peritaneum directs itself horizontally, to the right and left, behind the broad massles of the abdorson; in the first direction, it moves the excending colon s in the

other, the descending vulue; and forms around these introllines (wa fields, named the Lumber Meanule, which serve to attach them to the posterior wall of the abdomen. At the same time, it passes before the kidneys, from which it is separated by a thick layer of cellular tiesse, then, covering the unsters, the spermatic and remal vessels, the year cave and the acrta, it advances on each side towards the vertebral column, before which it is reflected from behind forwards, lying upon itself, in order to form the Mescatery. The mesentery is thus a process of peritoneum supporting the small intestines, extending at its base from about opposite to the second lumbar vertebra obliquely downwards to the right iling form. In the hypogastric region the peritoneum, traning it mesinly, descends from the umbilious towards the pubes, and covers the uruchus and the two umbilical arteries which raise it a little, so as to make it form three folds projecting backwards, confounded at the umbilical ring, and separated inferiorly. It is then aplind against the posterior surface of the recti muscles, and arrives at the upper edge of the ossa pubis, whence it is directed over the summit and posterior region of the bladder. There, it presents differences, according as it is examined, in the male or in the female, former, it invests the base of the vesicular seminales, and is reflected over the rectum, forming two similunar folds, separated by a cul-sle-sac, and called the Postsrior Ligaments of the Illadder. Opposite these folds and their separation, the positoneum is applied superiorly upon the univrice surface of the rectum; but almyr, it also covers its Interal surfaces, and constitutes. behind it the Memrestern, of which the upper extremity is continuous with the Him- Mestadon. In the female, the peritoneum passes from the bladder over the ragina, before which it forms two semilanar folds and an intermediate cul-de-say, similar to those which in the male occur between the rectum and bladder, but has distinct. It then invests the unterior surface, the upper relige and posterior surface of the sterus, and a portion of the corresponding wall of the vagina, prolonging itself to the right and left to form the Broad Ligurients. From thence, it gains the rectum, and presents the same disposition as in the male. The pe-

ritoneum then ascends before the sacro-vertebral articulation, and unites with the lamins which forms the mesentery. Laterally the peritoneum is at first seen reflecting itself from the walls of the abdomen over each fline fossa, covering part of the iliacus and pson muscles, embracing to the left the sigmoid flexure of the colon by means of the Hinc Memcolon, and to the right the encoun and its appendages by means of the Mesocreaw. A process of peritoneum which is upt to vary in its length, and thus gives to the easenm vary different positions in different subjects. From thence it ascends forwards behind Poupart's ligament, and forms two depressions on each side, called the Inquinal Forse, which are distinguished into interval and external. These fosses are separated from each other by the fold of the membrane which the umbilical artery supports. At the bottom of its summit, which is directed downwards and inwards, the peritoneum is seen to divea little into the internal orifice of the inguinal caual, Posteriorly the peritoneum, which has invested the illucfossie, ascends to be continued into the lumbar meso-The Epigastric Portion of the Perilpseum is of great extent, and very complex. 19. To the left it invests a portion of the diaphragm, and sinks into the most retired region of the hypochondrium as far as the vertebral column, whence it is successively reflected over the posterior surface of the splenie vessels, the posterior half of the inner surface of the spleen, its outer surface, its whole circumference, and the anterior half of its inner surface. There it meets the splenic vessels a second time near the fissure of the spleen, passes over the anterior part, gains the cardiac extremity of the stomach, and is continued into the anterior lamina of the great omentum. These laming of the peritoneum of which we have just been speaking, and which are comprised between the spleen and the stormels, are called gastro-splenie omento by many authors. 2. In the middle, the peritoneum leaves the diaphragm before its osophugeal aperture, arrives upon the anterior surface of the stomach, passes before the gastro-epiplair yeards, descends to near the cavity of the privis, and is reflected from below upwards as for as the comvex edge of the arch of the rulum thus contributing

to the formation of the great omentum. It then in-Vests the inferior surface of the arch of the colon, glides beneath the panerous and duedenum, forming the inferiar lamins of the transverse mesocoles, and is finally continued into one of the lamina of the mesentery. To the right, the peritoneum covers a less extent of the interior unclase of the disphragm. Arrived upon the posterior edge of the liver, it is reflected upon that urgan, farming a fold which has been inappropriately named its corniery ligament (ligamentum hypatis cornnarium). It covers its whole upper surface, at the middle of which it gives rise to another triangular fold which is its suspensory ligement (ligamentum heputis augmention). This fold divides the upper surface of the liver into two unrepeal parts, porresponds on the other hand to the dischragm, and is continued informely into another fold, named the Falx of the untilled rein. This fall in fact contains that with in its substance, and descends anteriorly and to the left as far as the undollious. The right lamina of the so-called suspensory ligament of the liver is then reflected under the ponease surface of the great lobe, unites with the rest of the peritonesses along its sharp edge, covers the gall-bladder, and at length forms altogether on the right, a small field which gains the displayers, and is called the right lateral or triangular ligarient of the liver (ligamentum hepatis triangulare destrum) This same lamina leaves the gall-bladder posteriorly, and slips before the duodenum to proceed uver the colon. The left humma is in line manner reflected undor the inferior auriane of the left lobe, unites upon its. sharp edge with that which covers the upper surface of the liver, and bends, near its posterior edge, to form the left lateral or triangular liquowat of the liver (ligamore and the anterior lumina of the keputo queltic counters, and to expand over the anterior surface of the stomach. The posterior covity of the omentum lies immediately under the neck of the gall-blodder, where a triangular sperture, the foraown or history of Wenshop, will be found, into which two fingers may easily be made to paramete. Through this operture there or seen to dive superinely the lamion of the peritonous which has formed the annulur

lamina of the hepata-gustric onsentum, which is thus applied upon itself, containing in its duplicature the cystic and hopatic dasts, and ductus communis chaledocus, the reas portse, the bepatic and pyloric arisrice, and capacita of Gission, and nearer to the cardia, the connery griery of the sigmath. This laming then directs itself over the whole posterior surface of the stomach, descends behind the gastro-epiploie vesida applies itself upon the partion of the pertoneum which has sunbraced the spleen and the anterior surface of the stamach, arrives along with it as far as the inferior edge of the great omentum, and afterwards ascende towards the convex edge of the arch of the colors. It then leaves this first lamina, covers the upper surface of the reduc, forming the upper lamina of the transcerie newauton, and proses alorer the panerens and duadenson. the base of the crura of the displangm, the very care and lobulus Spigelii. At length it passes through the foramen of Winslow, and is continued over the country surface of the right lobe of the liver. In following this course, the lamina of the peritoneum of which we have been speaking forms the walls of a large avoidal myay, the proferior energy of the amendum. This goody, which has no other issue than the foramen of Winslow, is formed anteriorly from above downwards by the hepatogastric omentum, the posterior surface of the stemark, the two lamelie of the anterior lamina of the great omentum. Posteriorly, and from beneath apparels, is is formed by the two lamelle of the posterior lamina of the areat omentom, the upper surface of the area of the colon, the upper lamina of the transverse mesoculou. and its producingation towards the labulus Spigelii. To prove those facts, insert the notale of a believe into the foramen of Winslow, and distend the great bag of the emeratum : this will generally succord in a healthy abdomen where the omentum has not been handled; or make an incision through the anterior lamina of the great unsustain coming from the great enevature of the stomach and pasting the hand into the great bag of the omention this laid open, the student may that extisfy houself of the existence of that layer of the pertime are investing the posterior surface of the stomach. and likewise examine the course of the supetior tamina. of the transverse mesocolon. The organization and general relations of the peritoneum. The paritoneum has precisely the same structure as the other scrous membranes which we have already examined. It is in general very thin, although not equally so in all its parts. Its thickness is greater in the loins and behind the interior wall of the abdomen than any where else. Upoutheliver, spleen, stomach, and intestines, and especially in the omenta, the thinness of this membrane is extreme. Nor is its adhesion to the organs which it invests uniform in all parts. It is very decided upon the liver. spleen, and intestines, with the exception of the duodonum; but is much less so upon the pancreas, bladder, uterus and vagina, as well as upon the diaphragm and the walls of the abdomen, which is especially remarkable in the lumbar regions and before the kidneys. In general, at the level of these different parts, in the excavation of the pelvis, the peritoneum has beneath it a great quantity of adipose callular tissue. It also contains much of that substance in the different folds which it forms, as the mesentery, mesocolon, &c. The student may now examine more carefully the various processes which the peritoneum forms.

a. HEFATO-GASTRIC OMESTER (omentum minus). Is a fold of the peritoneum, extending transversely from the right side of the cardia to the corresponding extremity of the transverse fissure of the liver, and from above downwards, from the inferior surface of the diaphragm to the pylorus and dooderum. It is under it that the foramen of Winslow occurs, and between its two laminas that the billiary and hepatic vessels are

lodged. It contains in general little fat.

a. The Great Omentum (owentum majors) is a very large field, free and floating upon the convolutions of the intestine. It is regularly quadrilateral, and commonly longer on the left side than on the right. Its base is attached anteriorly to the great curvature of the stomach, and pasteriorly to the arch of the colon. Its edges are continuous above, the one with the colic omentum, the other with the gastro-splanic omentum, and farther down with the neighbouring portions of the lumbar cola. It is formed of two laminum, each composed of two lamelles, four in all, the one superficial,

the other deep. The two lamellie of the anterior lamina leave between them and the great curvature of the stomach a triangular space, between which are situated the gastro-epiploic arteries and veins; also the long epiploic arteries and their veins, but they are afterwards confounded, procood downwards, and then turning upwards, escend together to form the posterior lamina. At the upper part of this latter, they separate again to embrace the seth of the colon, and form the transverse mesocolon. The one joins the mesentery, the other ascends towards the forumen of Winslow. There is found in the substance of the great omentum a large quantity of vessels (arter, epiploicae and their accompanying veins), and fat, the latter being generally dispersed in flakes.

c. Colic Omertum. This is a fold of the peritoneum which exists only on the right side, and is placed behind the great omentum; it nearly fills the angle formed by the union of the right and transverse portions of the colon; sometimes it extends as far as the econom or towards the splace; its two lamines are separated by the colic arteries and voice.

D. The GASTRO-SPLENIC OMENTUM is formed by the peritoneum, which, from the edges of the fissure of the spleen, proceeds over the cardiac extremity of the atomach. It contains in its substance the splenic ves-

sels and vasa breviora.

s. Besides the omenta, the peritoneum forms other folds, such as the mesentery, the mesocola, the mesorectum, the mesoenecum, the broad ligaments of the uterus, the suspensory ligaments of the liver, the adipose appendages of the large intestine, &c. It may be useful for the student to dissect most of these processes of the peritoneum, and thus, besides acquiring a knowledge of their general course, extent, and connections, ascertain in a practical way what is contained between their folds. Commence with the dissection of the Mescatery. The removal of one layer of this extensive process, and the fat which may be present, exposes the superior mesenteric artery and all its branches; the corresponding veins, the mesenteric or facigal glands, and the lacted vessels and superior mesenteric plaxus of nerves; all these parts will be described more carefully afterwards. Next dissect the

transverse meanniss. By laying up the transverse areli of the colon over the ofges of the thorax, it will be mon that the transverse mesoculor, together with that portion of the large intestine it incloses, figure a sort of partition agrees the abdomen; allow which will be found the stormels, liver, and spicen, and below, the small intestines, we. Dissect off the inferior layer of the transverse mesopolog, and expose the papereas, which is situated across the spine and between its layers. The ascending layer of the transverse mesocolos may be seen either by raising up the stomach after the hag of the omentum has been opened into, or by tearing through the lesser omeatum. The course of these layers has been already particularly described. Finally, upon the edges of the large intestines may be seen numerous small processes of their peritorical tunic; these are called appendices spipl ice. These appendices are probably analogous to the one-sta whose uses are unknown. They generally contain a good deal of fat.

382. The farther dissection of the abdomen may be proceeded with in two ways: 19. If the dissector he already acquainted with the riscera, he sught next to proceed with the dissection of the arteries and perves of the abdomen; but, 25. If this he not the case, and particularly if it he his first dissection of the abdomen, his attention should be exclusively devoted to the viscera. These organs are, I. The stomach, decidenous, isiunum, ileum, appendix rermiformis, coeum, ascending or right colon, transverse arch and descending or left colon, sigmoid flexure of the colon, proper regrum and peach of the recture; these last are privic viscera; 2. Liver, panereza, spleene 32. Supra-re-al capsules, kidneys and ureters; 4°. Disphragm, peak magnus, psons parvus, quadratus lumborum, ilineus internus: 5. The arteries, voice, and absorbent vessels within this cavity r lastly. The nerves of the walls and of the viscera, including the anatomy of crural hernia. As it is evident that a great multiplicity of important parts cannot be dissected upon and subject, we shall first consider the avatomy of those organs and muscles whose conaideration must precede the others, and without a correct knowledge of which the student can mover hope to become master of the anatomy of the arterial and nervous

Commence with the small intestines. Lay up the transverse arch of the colon over the edges of the thorax, and at the root of the mesentery will be found the termination of the duodename and the commencement of the jejunum; remove the jejunum after having placed ligatures above and below the section of the gat, and cutting through the mesentery at about an from the intestine, detach the jejunum and deam from the mesentery, having, however, about three or four inches of the lower end of the ileum in counexion with the colon. The following are the principal facts connected with this pertion of the intestinal tube.

263. The SMALL INVESTIGE (Intestinum tenne), in which the duodenum terminates, is the longest portion of the digestive canal. It forms a general great carve, of which the concavity is connected with the mesentery, while the convexity is free and floating, and it is moreover folded upon itself in different directions a great number of times, producing the convolutions. All these convolutions, of which the convexity is directed forwards, and whose concavity faces backwards towards the vertebral column, are placed close together, and constitute a considerable mass, occupying, to the abdomen, the umbilical and hypogastric regions, a portion of the lambur and iliac regions, as well as of the exeavation of the pelvis. This mass is circumscribed on all sides by the large intestines, that is to say, superiorly, by the transverse mesocolou and arch of the colon, which separate it from the stomach, the panereas, the liver and the spleen; to the right, by the encum and ascending colon; to the left, by the descending colon and the sigmoid flexure. The small intestine commences under the superior mesenteric vessels, on the left side of the transverse mesnealon, and terminates in the right iline region, opening into the large intestine, There results from this that its general direction is inelined from above downwards and from left to right. Its length is about four times the length of the hedy; matomists have divided it into two portions, although they have falled to useign fixed and distinct hours to each of them. The upper is named Jejunym, on account of its being commonly found empty; the other is

called Heure. The jojunum occupies the two upper fifths of the small intestine, and the ileum the rost of its extent. The division is arbitrary, and has no sufficient foundation. A projection called a diversionlant, composed of the same tunies as the intestine, and communicating with it, is occasionally found upon the small intestine; it has been supposed by Mr. Morkel to be the remains of the vasicula ambilicalis of the fortus, and by its presence marks a distinction in the canal above and below it : I concur in this opinion. The small intestine has a smaller calibre than that of the other parts of the digestive canal; it is wider above than below. Its outer surface is smooth, excepting on its posterior edge, where it is distitute of peritoneum and foilgnd between the two laminar of the measurery; its inner surface has the same appearance as the duodenum. (367.) There are seen upon it numerous villocities, disposed in the form of more or less prominent fringes, and extremely large valvalse considerates. But the latter are more numerous the nearer to the duodenum the intestine is, and diminish progressively towards the To display this inner surface, or mneous membrane, requires merely that a few inches of the intestine be laid open at each end, in order to contrast the appearance. The peritonsum covers the entire externalsurface of the small intestine, excepting at the posterior edge, where it is reflected to be prolonged backwards by two lamine which constitute the mesentery, and which leave between them and the intestine, at the moment of their coming together, a triangular space exactly similar to that which prevails along the curvatures of the stomach; in this space, the intestine does not adhere to the peritoneum, a circumstance which is favourable to its dilatation. To display the anatomy of the peritoneal tunic of the intestine, it is only necessary to distend the gut with air. The Muscular Membrone or Cont is displayed by stripping off the peritonnal from a portion of the intestine previously distended with air; the superficial fibres are longitudinal, thin, not nunterous, and collected aspecially along the convex edge of the intestine; they do not run along its whole extent, but are interrupted from space to space, and seem composed of shorter fibres whose extremities are interBUE

lared with each other; the deep fibres form a more distinct layer; they are curved in the transverse direction of the intestine ; but more of them pass entirely round it, they being interrupted like the longitudinal. The muscular membrane is connected with the peritoneum by a layer of cellular tissue, thin, and loose on the side next the mesentery. It is separated from the mucous membrane by another layer of denser and more compact cellular tissue, nervina end of the older writers. The sevents, ceilular, or vascular tonic may be examined either from within or from without, If from without, scrape off the peritoneal and muscular tunies; this shows the density and strength of the celfular tunie: if from within, evert a portion of the small intestine, turning it moldo out, and enclosing it in ligatures, and distend it with air, that the cellular tonic may be entirely filled with it. If this portion of the intratine he now dried, and afterwards cut neross, it will give a very good idea of the cellular tonic. The Moron Mendoque or Cart is whitish and thicker than in the stomuch. The valvale considerates are formed by its being folded upon itself. Its villosities are thinflexible, and collected into pellets or fringes. On examining them with the microscope, it has been thought that each of them is terminated by an eval ampulla perforated with a small hole, which Lieberkulm aunaiders as the entrance of a facteal vessel. The walls of this ampulla are lined with a net-work of arteries and veins; intervals which exist between these villosities are furnished with morous follicles, designated by the name of glands of Brunn, which form slight promisnences on the inside of the innestine; they are more numerous on the side next the mesentery than anywhere else; their form is round or oval. In addition to these mucous falliples, which Brann considered as most abundant in the duodenum, other small glandular looking bodies are found upon the mucous surface in various parts of the small, and even the large intestine. They were perhaps first described by Peyer, and as they are collected in considerable numbers, and have a distinct oval shape, they have of late been known by the mane of Poyer's Patcher. They are in general easily found by holding up the lutertime between the

eye and the light. In many animals they are much more extended than in man, as in the knogaroo, &c. The arteries of the small intention essent from the convexity of the terminating branch of the superior mesenteric artery. Its voins join the vena portae. Its Incteals, which are more unmorous above than below, and in the glands of the movements. Its nerves arise from

the superior mesonteric plexus.

364. Lange Investences (intrilivum crussow). Having thus examined the anatomy of the small intestines, princed with the large. Remove them cautiously from the body, in the same way as the small, entting through close to the intestine the various mesocola connecting them to the walls of the abdomen and to the stomach, &c.; throw a ligature around the top of the roctism. and leave it in the polvis for fature examination. The portion of intestine thus removed consists of, 1°, a small part of the ileam; 20, the appendix vernilormis; 37, the ensum; 4', the ascending colon; 5', the transverse arch; 6', the descending colou; 7°, the sigmoid flexare of the colon. The mode of examining the large infestion is generally similar to what has been recommended for the investigation of the small. The following are most of the anatomical facts:-The small intestine after diminishing in calibre, enters the large intestine upon its left side; the peritoneal tunic binds down this gut in a remarkable way to the large intestine, and it is this chiefly which gives rise to a valve, (flee-colle and ileo-coral calve), to be afterwards described. To satisfy himself of this, first let the dissector out through. the peritoneal tunic above and below the entrance of the small into the large intestine, and cautiously dissort through the close cellular substance connecting the termination of the small intestine to the evenue and colon. If this dissection he continued far enough, the valve will afterwards be found nearly destroyed, thus proving the mechanism of its fermation. Distend the large intestine with air, enclosing various parts with ligatures, and commence with the appendix termiformin. This appendix is the smallest part of the large intestine, and is the commencement of it; it is present in man, and in only a very few animals. Even Morgagni mistook the cream of the dag for the appendix remificants, which that unimal has not.

A. APPENDER Vanationeris, similar to the rest of the coccus in its structure; its fleshy cost is thick, and formed of longitudinal above. Three bands of the intestine seem to come from it, of which we shall speak presently; it communicates with the execum by an oriface which allows als readily to enter, but not to escape so untily. The mucous membrane, at its ordice, forms a sort of valvale. The appendix is sometimes wanting.

B. The Coxcur is placed between the end of the append a vermiformis and the colon, in the right ilian fossa. Its volume is often triple that of the small intestine, and surpasses that of the colon or rectam. Its length is about three or four finger-breadths, and no other limits can be assigned it, to distinguish it from the golon, thus the termination of the small intestine, Its outer surface presents very large halgings, irregularly disposed, and interrupted in three places by lungitudinal depressions formed by the union of the longitudinal muscular flores. One of these depressions is anterior, the other two are posterior, but one is turned to the right and the other to the left. In its interior, the occum is fined by a mucous membrane, which we shall alterwards describe. It presents three longitudinal prominences, which correspond to the three external depressions mentioned above, and reliules unnupying their intervals; separated by transverse folds, and forming externally prominences which we have also mentioned. Inferiorly and posteriorly, is seen the entrance of the appendix vermiformis, which is always free and open, and a little widened. To the left are the orifice of the small intestine and the ilro-culic value or valcule of Bankin. This valve, which prevents the return of the excrementitious matters from the esccum into the small intestine, is elliptical, broad, soft, thick, without support, and directed transversely. In the direction of its great diameter it is divided by a slit. which separates it into two lips united at their extremities, adhering to the intestine by their convex edge, and floating in its ravity by their concave edge. Of these two lips, the upper, which is narrower, corresponds

above to the colon and below to the small intestine; while the lower, which is brassler, faces the small intestime above, and the cocum below. Their extremities unite and form a prominent line on each side, which terminates insensibly in the straight part of the occurs. These ruggs were called by Morgagni the Frana of the Falcule of Bashin. The peritoneum wholly covers the inferior portion of the curcum, and invests the greater part of it above, forming its serous coal. It passes upon the walls of the abdomes, without in general forming any fold. Sometimes, however, a more or less distinct fold is observed, to which the name of meso corcum is given. The muscular membrane or cont, composed of longitudinal and circular fibres; the longitudinal fibres are united into three distinct bands, and are shorter than the intestine itself, causing it to present the prominences of which we have already made mention. These fasciculi seem to arise from the appendix vermiformis, and on cutting them transversely, the execum is immediately seen to elongate, and the transverse folds and prominences which it presented entirely disappear. The layer of cellular tissue which connects this membrane with the following is thicker than in the small intestines, but in other respects presents nothing remarkable. The warmer membrane or cont presents villosities much less apparent than those of the small intestine, and no valvable couniventes; it contains a greater quantity of mucous follicles, but they are isolated from each other. The ilco-colic valve is formed by the mucous coat of the small intestine and the cel-Jular coat which lines it, folded upon itself in such a manner as to project into the coccum before being continged into the same membranes of that intestine and of the colon. There results from this that it is formed of four mucous lamina, two for each of its lips, and that in their interval there occurs cellular tissue. But moreover, there is observed in the lower lip, a layer of strong muscular fibres of a whitish colour, which are continuous with those of the small intestine.

c. The Coxes extends from the right line region to the left, between the execute and the rectum, with which it is continuous, and describing various turns which have caused it to be divided into four portions. 1º- The Ascending Chin commences at the careum, and areands in the right lumbar vegion vertically and a little backwards, to near the edge of the corresponding false ribs, lying upon the quadrates lumburare and kidney of the right side; internally, connected with the inferior laminn of the transverse presocolon and the right lamina of the mesentery; externally, applied against the walls of the abdomen. Its volume does not much exceed that of the small intestine. Its mobility is not great, un account of its tring connected with the kidney and quadratus lumborum by a great quantity of adipose cellular tiseue. Sometimes, however, the peritoneum forms for it, posteroutly, a more or has been fold, which is named the right lumbar momentum. #". The dreb of the Color, or Transcerse Color, ecopies the anterior and inferior region of the epigastrium, beneath the stemach, above the small intestine, behind the great amentum, and before the transverse mesocolon. Its upper surface is free and smooth, corresponding to the fiver and the great curvature of the stommeli, which mivances more or less upon it and at its left and is in velation with the spleen. Its howeve suctions, which is also smooth and polished, rests upon the ness of the small unostine. Its undersir edge, which is convex, gives attachment to the great outcome, and is in contact with the walls of the abdomen; the parterior is concave, and embraced by a fold of the personeous named the teamperse metacolon, 3. The Descending, or Left Lombin Colon, commences under the spleen; it is placed behind the small intestine, and before the left kidney and quadratus lumbarum, with which it is connected by cellular tissue, or by a fold of the peritoneum nomed the left lumbur waspecien. 4. The Signaid Flexure of the Colon is very mobile, prespies the desper part of the left iliac forms, where it describes a double curve to the form of the letter S, whence its name. It commences at the end of the left lumbar region, and terminates at the upper strait of the pelvis, must the articulation of the last houshas vertebra with the secron. It is surrounded in nearly in whole circumference by the peritoneum, which fixes it above and behind, by means of a loose lible, directed obliquely from left to right, named the than menualwa. The colon thus describes in the abdo-

men a circle which measures nearly its whole circumference, and which contains the convolutions of the small innextine. In its whole extent, the colon, like the concum, presents interrupted bulgings, produced by three longitudinal bands; but these prominences, which are not so large us in the occount, ore almost obliterated in the sigmoid flexure. It also presents a very great number of fatty appendages, owing to particular folds of the peritoneous, and so multiplied in its ascending and descending portions, that they seem to envelope. it with a continuous layer; there are fewer upon the arch, and scarcely any upon the sigmoid flexure, where they are also much less voluminous. In its interior, the colon presents the same disposition as the execut. The peritoneum forms its serous mut, after loving enveloped. the intestine, fixing it to the neighbouring parts by different folds, which take their name from the portion to which they belong; the largest of those folds is the transcerse mesoculor, which proceeds from the conserve edge of the arch of the colon which it supports, and forms a borgzontal and moveable partition, which separates the epigastric region from the mobilical, and the stumach, liver, and spleen from the small innesting. It is brouder at the middle than at its two extremities, and has a nearly semicitentar form. It is composed of two lamina, an inferior and a superior: the former is continuous with the mesentery; the other is prolonged into the pusterior cavity of the peritoneum, and covers a part of the duadenum. In the interval of those two laminer are found the vessels and nerves destined for the arch of the colon, together with a great number of lymphatie glands. Between them and the courage edge of the intestine, there is observed an empty triangular space, similar to those which we have already described in the stomach and small intestine. Three two laminer, after aniting upon the culan, give rise to the posterior lamina of the great omentum. The iline wennedov varies much with respect to its extent and is similar to the other folds of the same kinds it is broader at the neiddle than its extremities; it is continuous above with the descending mesocolon, or treminates in a point behind the colon, and inferiorly is unsted to the morerectum; it also contains vessels, nerves, and some lymphatic glands. The mascalor and marms membranes are the same in the colon as in the co-cum. The arteries of the coream, of the astending colon, and of the right half of the arch of the colon are famished by the superior mesenteric artery. These of the other parts of the colon come from the inferior mesenteric. The veins of these two intestines form the two mesensit veins, and open into the vena ports. It is doubtful if any lacteds exist in the mesocolo. Its nerves are furnished by the two mesenteric plexuses. The total length of the large intestine is about seven feet in a man of ordinary size. It forms about the fifth of that of the small intestine.

365. It being presumed that the student is desirous of afterwards examining the disphragm and the deep museles of the abdomen, his next step perhaps ought to be the removal of the stomach, duodenum, liver, spleen, and pancreas in a mass. In doing this for the first time, he will receive the uid of the demonstrator or more advanced student. If he he desirous of examining the arteries and nerves distributed to these organs, he must proceed with their dissection and examination previous to removing any of the viscera-Having now removed these viscera, and laid them apart in a position somewhat similar to what they occupied in the body, next distend the stomach and duodenum with air, and clean them cautiously ; clean the paneress and expose its duct by cutting into the centre of the gland ; clean the vessels going to the splcen, and finally expose the ductus communis choledochus, ductus cysticus, and henatious, also the year portor and henatic artery. These vessels he will find inclosed by the capsule of Glisson, and within the layers of the small omentum: a ligature had better be passed around the ductus communis choledochus, so as readily to find it again.

366. The Stomach, (Fentriculus), is a conical, clongated musculo-membraneous reservoir, curved from before backwards and from below upwards in the direction of its length, slightly depressed on two opposite sides, continuous on the one hand with the asophagus, on the other with the duodenum, situated beneath the diaphragm, between the liver and the spleen, behind the left external ribs, occupying, at the upper part of

the abdomen, the epigastrium and a portion of the left hypochondrium. Its greatest diameter is transverse: the small diameter is vertical, gradually diminishing in proceeding from the esophagus towards the duodenum. Its two wrifices are considerably contracted, and are directed upwards and backwards. Its direction is nearly transverse, inclined slightly downwards, to the right and forwards, so that its right extremity is anterior and inferior to the left. When the viscus is filled with food, this obliquity is increased, and the stomach approaches the vertical direction. There are distinguished in the stomach, I', an external or outer surface : 2% two curvatures; 3', two extremities, each having an orifice, a larger to the left, and a smaller to the right; and lastly, 49, an internal mucous surface. P. The external surface is more convex anteriorly than posteriorly, turned a little apwards in the state of repletion, corresponds, from right to left, to the left lobe of the liver, to the displaragm and the false ribs, and in the state of distention only, to the anterior wall of the abdomen, over a great or less extent. It is always inclined downwards and forwards. Posteriorly flat, oblique, like the preceding. but of less extent than it, and directed slownwards when the negan is full, is always entirely concealed in the posterior cavity of the omenta, and is in connexion with the transverse mesocolon, and sometimes even with the arch of the colon and the duadenum. These two surfaces are smooth and polished, continually moistened, traversed by a great number of blood vessels, and of a whitish colour. 2. The Great Carauture is that margin where the two surfaces of the stomach meet externally downwards and forwards. The edge here produced is convex, and extends from the one orifice to the other; in the vicinity of the splace, and to the left, its convexity is greater than elsewhere. It corresponds to the transverse mesocolon and to the arch of the coion. It is as it were lodged in a separation of the lamellæ of the anterior lamins of the great omentum, so that, in the empty state, the peritoneum is not exactly applied upon it. It is to this space that the right and left gastru-epiplain arteries, and a certain number of lymphatic glands correspond. To the right, the great curvature of the stomach forms a bend, which correspouls to an internal depression, named the Small Cul-de-See. To the left, it presents a considerable prominence, named the Tubenaity or Great Cal-de-Sue of the Stomack, which, placed beneath the resoptiageal orifice, is prolonged into the lespectionerous, and diverges from the general dirretion of the viscus. increases its length in a decided acanon, and corresponds to the anterior bull of the internal surface of the spleen, with which it is connected by a field of the peritoneum, which lodges the cassa brevia. The Small Curuature is concave, and union the two surfaces of the stomach above and behind. It corresponds to the anets, the great lissure and labulus Spigelii of the liver, and extends from the one orifice to the other, without presenting either dilutation or cul-de-sue, on which account its dimensions are smaller than that of the great curvature. But, like it also, it is not ammediately invested by the peritoneum; for it ainks herween the two laming of the hepato-gastric omentum, and is consted by the coronary artery of the summuch. 3". The Cardia (Cardine, Left or Exophageal Extremity and Orifice), separates the two curvatures on the left side, and is placed beneath the diaphragm, and abuve the large extremety of the stomach, at the notion of the two right thirds and the left third of that viscus. It is in it that the esoplagus terminates. It is surrounded by a rirele formed by the coronary artery and vein, and by the extremities of the osophageal much of the pneumogastric nerves. It is also in relation with a part of the lett lobe and labulus Spigelii of the liver, and with the corresponding anterior side of the vertebral column, The Pylorics (Pyloric, Right or Intestinal Extremity and Orthor), is situated in the epigastrium, lower and more anteriorly than the cardiac orilina; it terminates the stomach to the right, forming the summit of the cone represented by that viscus, and makes it communicate with the duodenum. Placed in the direction of the two curves at once, it commences by a funnel-shaped exgansion, and terminates abruptly by a circular contraction; it generally assemble backwards and a little to the right, as far as the union of the two humans of the liver. It corresponds above and before to the liver, below and behied, to the pancreas, posteriorly, directly to the

right gastro-epiploic artery, and on the right side to the neck of the gall-bladder. It is often coloured by the transmission of the life through the walls of that reservoir, and surrounded by a number of vascular twies and nervous filaments. The internal (mucous) surface of the stomach is of a reddish white colour, having a marbled appearance; it is fined by mucous morebrane, and numerous and irregular wrinkles are observed upon it in its empty condition. The walls of the stomach are formed by three superimposed membranes, a serous, a muscular, and a mucous, There also enter into their composition cellular tissue, vessids and nerves. These tunies are dissected much in the same way as was shown in regard to the intestines. The Serays Membrase or Cost is formed by the peritoneum, and does not exist along the curvatures when the stomach is empty, as we have already said. There results from this disposition that the stamuels, in the state of vacuity, is no longer envered by the same portions of peritoneum which were in connexion with it during its distention; for it is then prolonged between the laming of the amenta. The peritoneum is white, transparent, smooth, and labricated externally by a serous thaid; united to the muscular membrane by a cellular tissue, loose on the edges of the stomach, but dense in the middle part of its two surfaces, where there is an intimate adhesion. The Muncular Membrane or Cout is thin, and differs essentially in this respect from the museular coat of the pharynx and asophagus. If is composed of fasciculi of salt whitish colours, never red, placed beside each other, and running in three different directions. 19. Some of these fibres, which are more superficial, are longitudinal : Less numerous and less uniformly diffused than the others, they form the continuation of the external muscular layer of the resophagus; the principal fasciculi form a bundle which runs along the small curvature as far as the pylorus; another bundle descends outhe great cub-de-sar, and is prolonged in the direction of the great currature; those which are capanded over the two surfaces of the etomoch are shorter and irregularly disposed; some of those latter collect into two small bands, the one before, the other be-

hind, which arrive at the pylorus after a course of about an inch. 2°. The fibres of the second kind, lying immediately under the former, are circular, and belong psculiarly to the stomach; they appear to have no connexion with those of the osophagus; less numerous at the cardia than on the rest of the stomach, and especially at the middle, and running parallel to each other, they never entirely encircle the stomach. 3". The fibres of the third kind are oblique; constitute two broad bands, one extending from the left side of the cardia over the two surfaces of the stomach, the other prolonged from the right side of the cardia over the great extremity, where it seems to replace the circular fibres, which occur there only in small number. A layer of dense and close filamentum cellular tissue unites the muscular to the museus membrane; this, the older writers improperly named the nervous root. The Murous Membrane or Cost is soft, spangy, of a raddish white colour, lurving a murbled appearance, continnally muistened with an abundant inodorous viseid finid, it presents numerous and purely accidental irregular wrinkles when the stomach is empty. When examined with a lens, especially at some distance from the orifices, it is found to be perforated with a multitude of holes dispused pretry regularly in quincuncial urder, not more than a fifth of a line in diameter, separated from one another by partitions, and thus countituting a kind of reticular warp, the tissue of which reburs between the falls of the mocous membrane of the ducdenum, and around Peyer's glands or follieles. It does not at first sight appear to be a continuation of the inner membrane of the osophagus, there being an apparent line of demarcation perecived between the two membranes, caused by the abrupt termination of the epithelium or epidermis of the mucous membrane of the excephages. The longitudinal folds which that of the ecophagus forms terminate at the cardia by so many mammella or tabereles; the procous membrane of the stomach is thicker than that of the osophagus, neither having villosities. Between the muscularand mucous coats of the stomach, and along the two curvatures only, are observed mucous follieles, of small size, opening on the inside of the viscus,

my sunk and not very apparent orifices. They are commonly called However's wheats, from the name of an auntumist who first described them. At the place where the pylorus presents the least width, there agcurs internally a circular rim, flattened and perpendicular to the walls of the critice | it has been improperly called the color of the pylorus ; it is morely a roultention of the muscular and mustons coats of the stomuch, corresponding by one of its surfaces to the cavity of that viscus, and by the other to that of the duodenum, the small circumference of which is thin, free and floating, so as to circumscribe a narrow aperture by which the chyme passes into the intestines. But its great circumference is formed by a particular fibrous ring, of a solid texture and white colour, placed between the two forementioned membranes. This ring is the pyloric muscles of some anthors. The arteries of the stomach are numerous and large, compared with the volume of the organ and the thickness of its walls. They come from the two gastro-epiploie, the pyloric, the coronary, and the splenic arteries. They creep at first in the cellular tissue between the peritoneal and muscular costs; but their secondary divisions pass through the latter, and their ultimate ramifications form a very delicate net-work in the substance of the mucous membrane. These arteries are extremely flexus our, on account of the changes of volume to which the stomach is exposed. The veins of the stomach bear the same name, and follow the same course as the arteries. They pour their blood into the trunk of the vena portm, or into one of its principal branches. Like the arteries, they anastomoso with each other a great number of times. The lymphatic vessels of the stoumch arise at its inner or outer surface, and present for the most part their principal tranks under the peritoncum; they may be referred to three orders; they go particularly to the glands placed along the two curvatures-The nerves of the stomach come particularly from the pnenmo-gastric nerves, and the three divisions of the co-line plexus.

367. The Duodesum, (ventricular ancestariatus) immediately succeeds to the stomach. It is less volumineus than that organ, but has a greater diameter

than the rest of the digestive canal, and is susceptible of great dilutation. It occupies the deep middle part of the abdomen, where it is concealed by the transverse mesocolon or by the stomach. The direction of the dustlenum is such that it may be divided into three portions. The first, which is about two inches long. commences at the valve of the pylorus, proceeds harizontally backwards and to the right, and ends near the neck of the gail-bladder, uniting augularly with the second, which has a variable length, and which descende vertically and a little to the left, as far as the third lumbar vertebra. The third portion is directly continuous with the second, with which it does not form an angle; it proceeds transversely to the left, before the vertebral culumn; and ends by being directed upwards and forwards, toward the upper extremity of the mesentery, above the superior mesenteric vessels, which cross its direction, and are embraced by a curve which it forms for them. The Jirzi portion is envered, in the greater part of its extent, by the peritoneum, and is in connexion with the hepato-gastric omentum. The record has no other connexion with the peritoneum than that of being covered by the upper lamina of the transverse messenton. The third is contained hetween the two laminte of that fold. From this disposition, the duodenum forms a senticircle which circumscribes the panereas, and has its concavity to the left, and its convexity to the right; it only appears to be kept in a fixed position in its two interior thirds. The relations of the duodenum to the neighbouring organs are the following; about, it corresponds to the liver and part of the neck of the gall-bladder; below, it is limited by the inferior lamina of the transverse mesonalon; anteriorly, it is covered by the superior lamina of this fold inferiorly, and by the stamach and right extremity of the arch of the colon above ; posteriorly, it is applied upon the anterior and right side of the vertebral column, the right kidney, the vena cava inferior, the arets, and the right pillar of the displaragm. By its whole inner side, it embraces the panereas, from which it is reparated below by the superior mesenteric vensels. Its outer side is immortand in the sub-puritocoul cellular tiesue, between the right kidney and the as-

conding portion of the colon. The inner surface of the duodenum is muraus like that of the stomach. There is seen upon it a multitude of circular folds, which differ in their configuration, and are close to each other; these are the culiwhy considerer: they are formed by the mucous membrane, and their existence is constant in all states of the dundenum, they project three or four lines in its ravity; some of them are oblique and cross each other, or run into those next them; their length is not the same in all; they never form entire circles, only representing arches which embrace the half, twothirds, or three-fourths of the intestine, whose pointed extremities advance unequally beyond each other; their breadth varies as much as their length. The use assigned to them is that of retarding the progress of the alimentary substances for the purpose of favouring the absorption of the chyle. The reticular tissue which we pointed out at the inner surface of the stomach shows itself in the hattom of the grooves by which they are separated. There is also observed in the interior of the dundenum, at the point of union of the second and third curvatures, a small tobercle, at the summit of which are seen the united or isolated orifices of the chaledochus and panereatic ducts. At its lower part the duodenum is continuous with the small intestine, without any very distinct line of demarcation being observed. The doodenum is not, like the stouach, invested with a serous membrane, the peritoneum being only applied upon it in a small portion of its extent; it is to this partial deliciency of the peritoneal coat that the intestine owes the family of dilating to such a degree as almost to equal the stomach in size. The purscular membrane or cont, is thick; all its fibres are transverse or circular, and have a great similarity to those of the stomack. The searous membrane or coat is reddish, soft, spongy, villous, and as if downy; it is of its reduplication that the valvalas considerates are formed; it possesses all the characters of the internal membrane of the stomach, and is truly continuous with it. Between it and the preceding coat, there is almeread a quantity of dattened mucous folicles, the orifices of which are more visible than in the stomach. The arteries of the duodenom are very numerous, and come

from the superior mesenteric, pyloric, panereatic, and gastro-epiploic arteries. Its rean exactly correspond to the arteries. Its lacteals and lymphatics go to the glands situated above the panereas. Its nerves come

from the solar plexus.

368. The Spines (Liev) whose uses, although ontirely unknown, seem to have some connection with the secretion of the bile, is a parenchymatous, vascular viscus, of a soft and spongy texture, and of a dark red colour, inclining to black, rarely uniform, and almost always marbled. It is placed deeply in the left hypochondrium, beneath the displangm, above the descending colon, between the taberonity of the stomach and the cartilages of the false ribs, before the corresponding supra-renal capsule and the upper part of the kidney of the same side. It is attached to the surrounding organs in a more or less house manner by folds of the peritoneum, and by a great number of vessels. Its form is that of a segment of an ellipse, of which the greatest diameter is nearly vertical. Its volume varies, and cannot be given with precision, any more than its weight. Its specific gravity, however, is to that of water as 1160 to 1000. The owter surface of the spleen is convex and in contact with the disphragm. It corresponds to the ninth, tenth, and eleventh ribs of the left side. The inner is divided into two parts by a longitudinal groove called the firsure of the spicen. This fissure never occupies the whole length of the organ, and is filled by vessels and fat. The posterior portion of the inner surface of the splera is applied upon the left side of the vertebral column; the anterior, which is a little larger, corresponds to the great cul-de san of the atomach. The circumference has an irregular form. Thicker above and behind than below and before, it is smooth and rounded, but intersected from space to space by notches varying in depth and number. It corresponds above to the aponeousis of the disphragus, below to the left kidney and supra-renal capsule, behind to the nancreas, and before to the walls of the thorax, through the intervention of the disphragm. The peritoneum invests its exterior, with the exception of the luttern of the floure, on the edges of which it is reflected to

he continued into the luminos of the membraneous folds which fix the option to the stunnels and displaragm. Thin, transparent, smooth at its outer surface, and adhering by the other, it is applied upon another cavelope of a fibrous nature. The fibrour excelope adheres intimately to the preceding by its outer surface, and by its inner sends a great number of delicate prolongations into the parenchyma of the organ. At the hottom of the fissure, it is in contact with adipose cellular. tissue, and furnishes other more distinct prolongations which accompany the vessels in the interior of the spleen, and whose number is consequently indeterminate. It is of a grayish white colour, pretty thick, strong, elastic, scantily supplied with vessels, and destitute of nerves. It is composed of the elastic tissue, The hlord-records, in proportion to its size, are numerons and large. Its principal arrery is furnished by the reelize trunk, is remarkable for its size, the thickness of its walls, its numerous windings, and the manner in which it divides in the fissure. It receives also branches from the capsular, phrenic, first lumbar and spermatic arteries of the left side. Its veins are not larger than the arteries, and are especially remarkable for the thinness and extensibility of their walls. They have no internal valves, and form one of the principal roots of the vena portse. Its moves come from the solar plexus under the name of splenic plexus, and from the left pneumn-gastric nerve. The lumphatics are numerous, and unite with those of the liver. There occurs a rather thin layer of cellular tissue around the splenic arteries and velos, extending deeply into the substance of the spleen, but not between the secondary divisions of the vessels, the interstices of which are filled with severn. The spleen is in general soft, and as it were spongy; internally, its colour is deep. It always contains a very great quantity of blood, which seems to be identified with its tissue, and which is met with in three different states, viz. in the arteries and in the veins, at takes place in other organs; and in a sort of intimate combination with the other organic elements, and with a certain quantity of aibumon. The latter is thick, slightly viscous, opaque, of a livid red colour like wine lees. It appears to be contained in

cellules or areoliz destined for itself, of which the walls are formed by the prolongation of the internal surface

of the fibrous envelope of the spicen.

369. PANUMEAS. The dissection of the posterosa requires no particular directions, further than to clean it enrefully, and to expose the duet; it is deeply seated in the abdomen, lying across the vertebral column, between the three curratures of the duodenem, behind the stomach, and to the right of the spleon; it is longer than broad, and Battened from before backwards, slightly concave postersorly, and thus accommodated to the curvature of the vertebral column; its right extremity is larger than the left. Its outerior surface is inclined upwards, covered by the upper lamina of the transverse mescolon, the stomach, and the first portion of the duodenum. Its garderier surface presents superiorly a groove in which are lodged the splenie yessels; it corresponds to the superior mesenteric vessels, the norta, the vena cava, and several nervous and symplestie plexuses. Its upper edge is intersected by the course of the colling artery, and is directed backwards; the lower lies upon the third portion of the duodenum, and is separated from it by the superior me-ateria vessels. Its left extremity is thin, prolonged beneath the spleen, to near the corresponding supra-renal capsule. The right cutremity or head is applied against the second portion of the duedenum, over which it commonly advances a little. There generally occurs beneath it a small mass, named the small passeyear. The panerras resembles the salivary glands in its structure. It is of a grayish white colour, inclining to red; its parenehyma is firm and isometimes, appears composed of lobes and granular lobules, which are distinct and connected by a dense cellular tissue; it is from each of these granulations and lobules that the radicles of its exerctory ducts arise, which are slender, and unite in the manner of veins. The duct itself is generally single; placed in the substance of the organnear its lower edge, directed from left to right, and increasing in size from the numerous branches which it receives in its course, this canal proceeds in a serpentine manner towards the duolenum, disenguess itself from the gland, becomes free lashing the against

portion of the intestine, and is then of the size of a crow-quill. Near its extremity it receives an excretory fluct which comes singly from the small pancreas, and shortly after opens at an acute angle, into the ductus communis choledochus, or adheres to it to enter the duodenum by itself. The walls of this duct are whitish. The arteries of the nancreas are numerous, but their size is small. They come from the outline, splenie, superior mesenterio, right gastro-epiploie, coronary, and left eageular arteries. Its veins your their contents into the roots of the year partie, and in particular into the small mesurnic and splenic veins. Its nerves are supplied by the solar plexus; and its lymphaties go to be divided in glands to which it gives its The pancreas secretes a fluid which appears to have much resemblance to the saliva, and which mingles with the hile to be poured into the duodenum.

370. The Liven. To examine this organ advantageously, the vessels enveloped within the capsule of Glisson must be divided, first tracing the ductus communis choledochus to the duodenam, the vena portee to the splenic and superior mesenteric yeins, and the heratic artery to the codine axis, of which it is a branch. Having thus detached the liver from the sarrounding organs, proceed with its systematic unntomy. The liver is the largest gland in the body. It is a single, unsymmetrical organ, dense, easily torn, and of a reddish brown colons. It accupies the whole right hypochondrium, and a part of the epigastric region. Its general form is irregular. Its weight, in the adult, varies from two to five pounds, and its specific gravity is 15.203. Limited above by the diaphragm, if is protented anteriorly by the base of the thorax, beyoud which it does not pass in the sound state, although it may be liable to undergo some slight changes of position, according to the state of the neighbouring organs, and the posture of the body. The Upper Surface of the Liver is convex; turned directly opwards at the left extremity; looks backwards medially, and inelined straight outwards; it is everywhere contiguous with the disphragm. A fold of the peritoneum (dospenmey Ligament of the Liver) divides it from before backwards into two unequal portions, which are named

Great or Right Lake, and the Small or Left Lake. The Inferior Surface of the Liver is of less extent than the upper, irregularly conears, and inclined a little backwards, presenting from right to left the following parts: 1º- A broad and superficial depression, which belongs to the left labe, and rests upon the upper surface of the stomach. 2°. The Longitudinal fazure, pasaing from before backwards, and reparating the two lobes below, as the suspensory ligament does above. This groove is more or less deep, and in its lower half is frequently converted into a canal by a portion of the substance of the liver, which passes from one labe to the other. In the focus, it lodges anteriorly the umbilical vein, and posteriorly the ductus venosus; and in the adult it is occupied by the fibrous cords which are formed by the remains of these obliterated yeasels. 3". The Transverse fixmer is less deep and shorter than the preceding, (which it intersects at right angles), follows the direction of the great diameter of the liver; it occupies about the middle third of that organ, a little nearer its posterior than its anterior edge; it commences upon the right labe by a narrow slit, then enlarges much as it proceeds towards the left side. It lodges the sinus of the vena portie, the hepatic artery, the roots of the hepatic duct, nervous filaments and lymphatic vessels. All these parts are connected together by a dense, compact, and fibrous sheath (Copsule of Glisson), 4°, The Greece of the Vena Cara Inferior, situated behind, near the convex edge of the liver, very short, but deep, and often converted into a true canal. 5°. The Lobelin Spigelii, a mamillary eminence placed behind the transverse groove of the liver, in the posterior cavity of the peritoneum, beneath the gastro-hepatic omentum; its form is commonly that of a more or less obtuse triungular pyramid. A prolongation (Isbalus comlatus) passes from its base to the eight lobe of the liver. The lobulus Spegelli rests posterisely upon the vertebral column, between the vena cava inferior and the usophagua 6°. The Lahutwo Quadratus, broad, elevated, separates the anterior bolf of the longitudinal fissure from a superficial form of an eval form, which lodges the gall-bladder. 7". Two angerhelal depressions, of which the anterior corres-

ponds to the right extremity of the arch of the colon. while the posterior corresponds to the right kidney and supra-renal capsule. The Circumference of the Liver is irregularly quadrilateral, varying in thickness at the different parts of its extent, and everywhere, excepting at its posterior part, embraced by the peritoneum. Anteriorly, thin, convex, applied against the base of the thorax, and interrupted by two notches. Of these, one is narrow and deep, and is formed by the anterior extremity of the longitudinal fissure; the other is becoder, but more superficial, and placed to the right of the first; it corresponds to the funder of the gall-bladder. This part of the circumference of the liver is horizontal in the middle, but, to the right and left, is inclined downwards. Postersurly, the circumference of the liver is shorter than before; but its thickness is considerable, especially to the right. It is rounded, and attached to the displarage, near its extremities, by two folds of the peritoneum, which are named the Lateral or Triangular Ligaments of the liver. A deep notch corresponding to the vertebral column marks this posterior margin. At the middle, it is united to the disphragmatic aponeurosis, in an intimate manner, by a dense and close cellular tissue. It also presents the end of the longitudinal fissure, and that of the vena enva, together with the trunks of the bepatie veins. To the right, the circumference of the liver is thin at its fore part, thick behind, where it is in contact with the diaphragm. To the left, it presents a thin and convex edge, which is sometimes prolonged as far as the splean. The Serous or Peritowal Envelope of the Liver is a prolongation of the peritoneum, reflected from the lower surface of the diaphragm over the liver, which it does not surround in its whole extent. This envelope is transparent, smooth, polished, thin, and constantly bedewisd with a serous fluid. Free on the side next the abdominal cavity, it adheres by its other surface to the second envelope, and those not cover the posterior part of the circumference of the organ, the two grouves of its inferior surface, that of the vens enva, and of the foesa destined to halge the gall-bladder. It is equally wanting in the interval of the two lamines of the suspensory ligament, as it is of itself that this alleged lightment is formed. The Deep or Cellular Eurelope of the Liver is much more extended than the superficial, for it covers all the parts of the liver upon which the peritoneum is not applied, and is prolonged into the substance of that viscus, forming sheaths which accompany the branches and twigs of the vena ports and bepatie artery, as well as the mots of the hepatic duct. athere to the parenchyma of the liver by numerous filaments, and do not present the least appearance of the muscular structure which Glisson attributed to them-In general thin, though dense, this envelope is much more apparent in the places of the surface of the liver where it exists alone, than in those where it is in connexion with the peritoneum, to which it adheres intimately. The Bhoal-Fessels and Lumphatics of the Liner are numerous. Some of them carry the blood to the liver: such are the hepatic artery, the vena purie, and, in the feetus, the umbelical vein. Others carry it off, after it has resided for some time in the organ; these are the hepatic voins. The lymphatics of the liver are extremely numerous. Its nerves are abundant: they come from the pneumo-gastric nerve, the phrenic nerve, and the hepatic plexus. The Parenchyma presents a reddish or yellowish tint superadded to the brown colour of its surface. Its general aspect is perous, from the great number of small vessels which have been divided in cutting it. There are moreover observed in it small yellow dots irregularly disseminated, which correspond to the radicles of the exerctory ducts of the bile. The nature of the vessels which traverse the parenchyma of the liver in different directions, is indicated by the direction which they follow: thus, the branches of the vena portae and hepatic artery, and the roots of the hepatic duct, proceed herizontally in the direction of the great diameter of the liver, while the trunks of the hepatic veins direct themselves in a converging manner towards its posterior edge. The orifices of the divided branches of the rena norths are collapsed, and those of the hepatic veins remain circular; this depends upon the circumstance. that the former of these vessels is accompanied by a cellular shouth which prevents it from adhering to the parenchyma of the liver, while the others being destitute of thin particular envelope, are intimately united to it. If the tissue of the liver be torn, it appears uneven and formed of roundish grains or solid polygons, in which end the extreme ramifications of the vena portaand hepatic artery, and where proceed the radicles of the biliary duets, hepatic velos, and deep seated lymphatics. These granulations are about the size of a millet seed, of a soft and dark red colour, and appear to be united to each other by cellular tissue.

The Exerctory Apparatus of the Bile is complicated. It consists of the hepatic duct, which issues from the liver, and after passing over a certain space, unites with the cystic duct, which ends in the gall-bladder, and of the ductus communis cholodochus, which results from their junction, and terminates in the ducdenum.

A. The Hapatic Duct arises by a number of slender radicles in the granulations of the liver. These radicles successively unite into larger branches which accompany the divisions of the vena poeto and hepatic artery. These branches are then united into two principal trunks, one for the left lobe, the other for the right, which issue by the transverse grouve of the inferior surface of the liver, converge towards each other, closely connected with the corresponding branches of the vena portie, and end at a right angle. At the point of union, some small branches of indeterminate number and variable size. join them. The hepatic duct is about an inch and a half in length and a line and a half in diameter, deseends obliquely inwards between the laminus of the gastru-hepatic omention, before the vena porte, behind the right branch of the hepatic artery, to the left of the neck of the gall-bladder and eystic duct.

a. Gall-Bladder, a membraneous, pyriform or ovoidal reservoir, situated in a superficial depression of the under surface of the right lobe of the liver. It is placed obliquely, so that its large extremity is directed forward, to the right and downwards, while its summit looks backwards, upwards, and to the left. In the gallbladder we distinguished a body, a fundus, and a summit or neck. 1°. The body atheres above, over a variable extent, to the substance of the liver, through the intervention of a layer of lamellar cellular tissue, and several ramifications of blood-vissels. Inferiorly, free and covered by the peritaneum; it lies, in this direction, upon the pylorus, the commencement of the dundenum, and the right extremity of the arch of the colon-25. The finedus is rounded, in general passing beyond the circumference of the liver. B'. The neck or summed is curved upwards, and narrow. It is continued into the cystic duct. The internal surface of the gall-bladder is generally tinged with green, from the effect of the bile which it contains in its envity. It is rough, reticulated, and plicate, presenting in its whole extent. rounded or polygonal areals of very variable breadth and depth, and more especially apparent towards its middle. In the varinity of the nock of the gall-bladder. there are observed several valvular and prominent folds, which appear destined to diminish the velocity of the bile in that place. The gall-blodder has walls composed of three superimposed membranes, a serous, a redular, and a musius. The Serour Membrane belongs only to the free surface of the gall-bladder, and is formed by the peritoneum which is reflected from the lower surface of the liver, and which is continuous with the superior laming of the gastro-hepatic omentum. The Cellular Merchrane is compact. On the side next the liver, producing the adhesion of the gall-bladder; on the other surface, it unites the serous with the mucous membrane. The Macous Membrane during life is supposed to be whitish, and it is only after death that it is tinged green by the transadation of the bile. Neither crypts nor follicles are perceived in it, there being only found in it some small grains, analogous to these organs, between the valvular folds of the pack. It is, however, covered with a great number of fungoid papille very close to each other. Its arteries are furnished by the cystic twig of the hepatic artery. Its reins go to the vens ports. Its nerves come from the henatic plexus, and its lymphatics join those of the liver.

c. The Ductus Cysticus, placed, like the bepatic duct, in the substance of the gustro-hepatic orientum, is smaller than it; they meet at an acute angle and units.

B. The Duckers Comments a Commonwest results from the union of the cystic and hepatic ducts; about three and a half inches long, and lodged between the lamines of the gastro-hepatic ementum, before the vena porter and below the hepatic artery, surrounded with cellular tissue, it descends behind the right extremity of the pancreas, and the second portion of the duodenum, inosculates with the pancreatic duet, or merely runs along side of it, enters obliquely between the floshy and mucous coats of the intestine, and opens, an inch lower, in the duodenum, near its last curve; its mouth is placed upon a small mammillary eminence, and is furnished with a membraneous fold. The different experity duets of the bile are formed by two distinct membraneous laminas, an outer and inner. The near appears composed of white longitudinal fibres; the inner is mucous, very thin, and familished with a small number of papille. It is continuous with the laterant member of papille.

branes of the gallbladder and duodenum. 371. The only organs now left within the exvity of the abdomen, independent of muscles, vessels and nerves, are the kidneys and areters, and the supra-remal glands; but although these ought to be eleaned at this stage of the dissection, their being no occasion for their removal, they ought to be allowed to remain until the pelvis be examined. The student should proceed therefore with the dissection of the larger trunks of the veins and arteries, and with the deep muscles of the abdomen; histly, by leaving the right or left iliac fosses avdiscreted, the student may afterwards more conveniently examine the anatomy of the parts concerned in crural hernia. After eleaning the great trunks of the arteries and veins and their branches, clean the following museles, regardless of whatever may be situated upon or near them, that is, of whatever obstructs his view of them.

372. The DIAPHRAGE (Septem Transversem, Midriff.) is a single, broad, and membraneous muscle, situated obliquely between the thorax and abdomen, which it separates. Its figure is nearly circular, fleshy at its circumference, aponeurotic in the middle, and forms a kind of elliptical arch, mobile and flexible, but not symmetrical, a singular case in the system of muscles under the influence of the cerebral nerves.* The

Physiologists usually divide the moneular system into voluntary, involuntary and mixed; to this last class belongs the diaplingm. The writer of this work for the last twelve years, has

central aponeurosis, called the Cordiform Tenden, in of considerable breadth; it is notched behind towards the vertebral column, and anteriorly is three lobed, on which account it has been compared to a trefoil leaf; of the three lakes of this aponeurosis, the middle is the largest, the right is a little less, and the left the smallest. The libres of the aponeurosis are all of different lengths and directions. In their general disposition, they are radiated, proceeding from the posterior notch to the circumference of the lobes; they are interlaced with each other, and with more superficial and looser planes of fibres, which occur at the upper and under surfaces of the muscle, and describe nearly transverse curves, an arrangement which is especially evident on the right side; they are white and shining, with a pearly and satiny lastre, and are denser toward the upper surface of the aponeurosis than toward the lower. Between the right and middle lobes, near the vertebral column, is an aperture of a square form, with anequal sides; it gives passage to the vena cava inferior, to which it adheres pretty strongly. Its anterior side is the shortest, and not very distinct from the right, which is the longest. Each of its sides is formed by a particular layer of aponeurotic fibres, which are interlaced with the neighbouring layers at its extremities. Besides this aperture for the vena cava inferior, there frequently occurs a hole for the displangmatic vein, and one or two other holes for the vence cavas hepatiene, which are all formed in the cordiform tendon. The fieshy fibres proceed from the whole circumference of this aponeurosis, to be directed forwards, laterally, and backwards, The anterior fibres are short, directed downwards and forwards. to the xiphoid cartilage, where they terminate by short aponeurotic fibres. Between these fibres and those which come from the cartilage of the seventh rib, there is a triangular interval with its base below, by which the collular tissue of the thorax communicates with that

recommended that these terms be faid solds; and the following substituted; mondes usually acting sold our coveriences; indiscles acting soldiest our consecutation; there terms the enthor has used in his Lectures for the Loc ten years, and they will be found to involve a good many of the modern physiological districts of monochar action and of sensation. of the abdomen. The lateral fibres are the most mumorous arising from the right and left lobes, and proecod toward the circumference of the base of the chest, to be attached to the inner surface of the last six ribs. by digitations which are interlaced with those of the transversalis alidominis. The first of these digitations is attached to the outer half of the posterior surface, and of the upper edge of the cartilage of the seventh rib; the second, which is the longest of all, is inserted into the corresponding parts of the eighth rib; the other four, which become gradually shorter, are moreover slightly attached to the bony portion of the four last ribs. Of these lateral fibres, the posterior terminate in an aponeurotic hundle, extended between the extremity of the last rib and the base of the transverse process of the first lumbar vertebra. It has been named the Ligamentum arenatum Diaphragmatis, and is merely the upper edge of the anterior lamina of the aponeurosis of the transversalis abdominis, which slightly covers the quadratus lumborum and the last intereastal nerve, strengthened however by additional tentinous fibres. This Ligamentum arcuntum externum or longum, surves two purposes; being stretched over the superior margin of the quadratus lumborum muscle, it permits that musele to proceed upwards behind it to be attached to the last rib; and it further gives attachment by its superior margin to the fleshy fibres of the great muscle of the diaphragm which are here very generally feeble and even altogether wanting. Lastly, in the two last intercostal spaces, the diaphragm is continued by common aponeurotic fibres, into the transversalis abdominis. The posterior fibres proceeding from the posterior notch of the uponeurosis, are directed in small numbers to an aponeurotic arch, extended from the base of the transverse process of the first lumbar vertebra to the body of the second, under which the upper part of the psons muscle passes. This arch is the ligamentum areuatum internum or breve stretched over the upper portion of the passe muscles. But the fleshy fibres generally unite into two bundles, named the Pillars or Crura of the Diaphragm. Of these crura the right is longer, broader, and thicker, and situated nearer the middle line of the vertebral column; it is attached to the bodies of the

four first humbar verteless, by as many tendinous digitations. The left, which is narrower, shorter, more alender, and situated more to the side, is only attacked to the bodies of the three first lumbar vertebrae. These two erum leave at first between them a considevable separation, which constitutes a narrow, oblong aperture, a little bronder before, situated toward the middle of the vertebral column, all theby in its circumference, through which the usophigus and pneumpgustric nerves pass from the thorax to the abdomen. Immediately after, there is detached from each of them a fleshy bundle, which is interlared with that of the opposite side; the anterior bundle, which descends from the left crus to the right, is the larger. These two bundles complete the lower part of the coophagent aperture, and form the upper part of another opening of a parabolic form, situated between the two cross and vertebrae, which gives passage to the norta, vena azygos. and thoracic duct. This operiure, which is situated more posteriorly and more to the left than the preceding, is further distinguished from it by having its margin aponeurotic and continuous with the tendons of the erara, and further by not being in the diaphragm but behind it. On its sides and behind, are spaces left between the fleshy fibres, for the passage of the splanchnic nerves. The upper or thoracic surface of the diaphragm is convex and inclined backwards. Its middle part is strongly connected with the pericurtium, and corresponds to the mediastina. Its sides which are lined by the plears, support the base of the lungs. Anteriorly, it covers the triangularis sterni; on the sides, the intercostales interni; and posteriorly, the aorta, psoas maguus and quadratus lumborum. Its inferior or abdominal surface is concave in its whole extent, and a little inclined forwards; but its concavity is not regular, being greater to the right than to the left, apparently from the presence of the liver; in the middle it is mearly plain. Posteriorly, the kidneys, the suprarenal capsules, the panereas and the duodenum; on the right side, the liver; and on the left, the spleen and stomach are connected with it. In the rest of its extent, it is covered by the peritoneum, so that it is placed between two serous membranes, but not furnished with

a special envelope. On these two surfaces there are vessels and nerves of considerable size, which belong particularly to the diaphragm. The cornenference of the diaphragm corresponds, anteriorly, to the ensiform cartilage, and the triangularis sterni; on the sides, to the ribs and internal intercostal muscles; posteriorly, to the vertebral column, the aorta, the thorseic duct, and the proze and quadratus lumborum muscles. The diaphragm separates the thorax from the abdomen, and serves to support the viscers which these great cavities contain. But it also performs motions, which, by varying the dimensions of these cavities, have the greatest influence upon many functions. When it contracts, the convexity which it forms in the thorax disappears; its fibres, from being curved, become straight; the aponeurotic centre acquires more obliquity; the thorax is thus enlarged, and the abdomen diminished; in ordinary circumstances, it is the only muscle that produces inspiration. If its contraction is carried farther, it draws the ribs toward the vertebral column, which diminishes the transverse diameters of the thorax. When it relaxes, it resumes its former dimensions, ascends in the thorax, forms there the same arch, compresses the lungs and thus contributes to expiration. During contraction, the lateral parts of the displangm descend much more than the middle part, which is retained by the pericardium and mediastinum. During the same action, the osophagus is compressed, the aperture through which it passes being entirely fleshy; but this does not happen to the vena cava, vena azygos, norta and thoracic that, the circumference of their apertures being aponeurotic. The motions of the displiragm also produce various remarkable phenomena, as righing, yawning, coughing, sneezing, laughing, subbing, and laccup, which are all more or less connected with the motions of inspiration and expiration. It is also subservient to small in the action of anuffing odoriforous efficien, and contributes to the formation of the voice in crying, singing, &c. By constantly pressing upon the abdominal viscera, it subjects them by its motions of elevation and depression to a tassing which is favourable to their functions. It also contributes essentially, when it contracts strongly, to vomiting, the excretion of the feees and urine, and the expulsion of the feetus. The pacer, iliacus, and quadratus lumborum abould be disserted only on one side at first, leaving those of the opposite side until after the examination of the parts in crural heroia.

373. The Pagas Panyus is not always present. It is situated externally to the prose magnus, over which it is applied, arising by abort appropriates, from the lower part of the body of the last dorsal vertebra, and the fibrocartilage which separates it from the first lumbar vertebra, and it sometimes sends a small tendon to the transverse process of the tweifth vertebra of the back. The fleshy fibres cease opposite the fourth lumbar vertebra, and are replaced by a flat tendon, breaming broader as it descends, and which turns over the proas magnus, passing to its inner part. This tendon terminates at the ilco-pectineal eminence, and the neighbouring part of the body of the pubes, sending to the iliac fascia a broad and thin membraneous prulangation, which covers the flingus and psous magnus, auterially, rovered above by the diaphragm, afterwards by the renal vessels and nerves, and by the peritonoum, and below by the external iline artery. The posterior surface is united to the poors magnus by cellular tissue. Use, to bend the pelvis on the vertebral column, or the apposite,

374. Psoas Mansus, situated on the side of the vertebral solumn at its lower part, and along the upper strait of the pelvis, extending to the upper and fore part of the thigh; of an elongated form, thicker in the middle than at the extremities, rounded at its middle part, but at its upper thin and flat, and tendinous at the lower. It arises, by short apaneuroses, from the lateral and inferior part of the body of the last dorsal vertebra, from a small portion of the posterior extremity of the twelfth rib, from the side of the bodies of the first four lumbar vertebre, from the fibro-cartilages which separate them, and from the base of the corresponding transverse processes. Between the latter insertion and the others, there is a space in which are ledged the branches of nerves, which commer to form the lumboabdominal plexus. The fleshy body forms at its upper part a flat and nearly vertical bumble, which becomes rounded as it descends, and afterwards directs itself towards the sides of the upper strait of the pelvis, where it gives rise, new the crural arch, to a strong tendon.

This tendon is placed at the inner side of the muscle before being totally separated from it, and is even concealed among its fleshy fibres, until close to the lumbar vertebrae. It receives, by its outer side, the fleshy fibres of the ilineus internos, (and hence these muscles really form a bicipital muscle, which ought long ago to have been described under a common name, as they are never distinct); it next passes under the crural arch, in the notch observed between the dec-pectineal eminence and the anterior and inferior iliac spine, descends inwards and backwards, over the capsular ligament, and terminates by embracing the trochanter minor. The external sweface of the psoas magnus, which is at the same time waterior, corresponds: that part of it which is above the crural arch, to the diaphragm, the kidney, the iliac fascia, and the peops minor, when it exists. Below the arch this surface becomes entirely anterior, and is covered by the cellular tissue of the hend of the groin, then by the crural arrery and the corresponding vein. Its inner explace, which is applied upon the sides of the bodies of the lumbar vertebrus, and upon those of the corresponding intervertebral fibro-cartilages, is yet separated from these parts by the lumbar nerves and vessels; it leaves between it and the fifth lumbar vertebra a triangular interval, filled with cellular tissue; then, becoming parrower, it is in conmet with the external ilias vein and the tendon of the psuas purvus, and descends parallel to the pertineus, from which it is separated, at the lowest part, by the internal circumflex vessels. Its posterior surface is applied above upon the quadratus lumborum, from which it is separated by the lumbar nerves, and the anterior lamina of the aponeurosis of the transversus abdominis-Farther down, it is connected with the os innominatum, and the capsular ligament of the hip joint. A synovial bursa of great extent separates the branch of the pulies and the capsular ligament of the hip joint, from the tendon of the psous magnus, which it embraces behind. This bursa frequently communicates with the hip joint, but not oftener in old than in young persons, as the second Dr. Mouro imagined. The psous magnus bends the thigh on the pelvis, directing the point of the foot a little outwards. It acts, especially in the standing posture, by retaining the body when it tends to fall backwards, and can even bend the polvis and vertebral column on the inferior extremity. This flexion is direct when the muscles of both sides contract at the same time, but it is oblique if only one sets. This muscle

performs a principal part in walking.

375. The ILIACUS lies in the iline fossa; broad and thin above, thick and narrow below, arising by aponeuroses, from about the upper three-fourths of the illac fossa, the inner lip of the two anterior spenous processes of the ileum, the ilea-lumbar ligament, and the two anterior thirds of the inner lip of the ilian crest. Its fibres converge and descend; the inner, which are very short, vertically; the outer more and more obliquely; the latter are the longest; all successively inserted into the outer edge of the tendon of the psons magnus, which they accompany to the small truchanter, passing with it under the crural arch. Its anterior surface is concave above, and convex below; covered, above the crural arch, by the iliae fascia, above which is the peritonoum, and by the corcum to the right side, and the sigmood flexure of the colon to the left side. The portion of this surface which is below the arch, corresponds externally to the surtorins; internally, to the pectinens and the crural vessels and nerves; anteriorly, to the cellular tissue of the fold of the groin, which separates it from the crural aponeurosis. Its posterior surface povers the iliac fossa, the upper extremity of the rectus muscle, and the hip joint. It hends the thigh upon the pelvis, or the latter upon the thigh, and acts powerfully in maintaining the body in the creet posture.

876. The QUADRATUS LUMBORUM, flat, thick, irregularly quadrilateral, situated in the loins, upon the sides of the vertebral column, and in the posterior wall of the abdomen. It is attached below, by apuneurotic fibres, and over an extent of about an inch, to the middle and posterior part of the iliac crest, also to the ilcolumbor ligament, and by some transverse fibres, to the transverse process of the fourth and fifth lumbar vertebrat. The firshy fibres which come from the os intominatum ascend to the last rib, and terminate in nearly the whole length of its inferior edge; those which arise

from the ligament proceed upwards and inwards, and terminate in four aponeurotic slips, continuous at their edges, and attached to the fore part of the base of the first four transverse processes of the loins. In addition to these tendinous slips attached to the transverse processes of the lumbar vertebre, and which proceed from below upwards, there run very constantly a series of other tendinous slips from above downwards, proceeding as it were from the direction of the last rib downwards to the transverse processes of the second, third, and fourth of the lumbar vertebra; these tendons lie anterior to the others first described; anteriorly, covered above by the disphragm, and in the rest of its extent by the anterior lamina of the aponeurosis of the transversalis abdominis, and by the psons magnus; it corresponds to the kidney and colon by the intervention of other parts. Its posterior surface is separated from the sucro-spinalis by the middle lamina of the aponeurosis of the transversalis abdominis. This muscle inclines the loins to one side; it lowers the last rib, and is subservient to expiration, being an antagonist of the scaleni muscles in this respect; it can also raise the haunch-

377. Chural Herria. We have (303) given a description of the parts concerned in crural hernia from without. But to understand them properly, they require also to be dissected from within the pelvis-Strip off the peritoneum from the lower flap of the abdominal walls, and from the iliac fossa; this exposes the inside of the fascia transversalis and of the fascia iliaen; these fascile are thus seen to be one and the same, or more reflexious of each other, the iliae portion is, however, almost always distinctly fibrous. If this fascia iliaca be now traced to the iline vessels, it will be there found to dip down into the pelvis behind the vessels, and thus to become in sume measure continuous with the pulvic fascia. external iliae artery and vein are united to the fascia by a layer of cellular substance, this constitutes the shouth of the vessels, and accompanies them out of the pelvis into the thigh. At their passage below Poupart's ligament, the cellular sheath may be seen uniting firmly to the fascia transversalis, and this union, together with the circumstance that the fascia transversalis and fascia

ilinea are but one, prevents the possible occurrence of bernia at any point external to the passage of the vessels. But from this point inwards towards the pulses, the walls of the abdomen beneath Poupari's ligament are naturally weakened, particularly in the female, ouring to the width of the pelvis; it is here, therefore, on the pelvic side of the common femoral vein, and to the iline side of the semilanar edge of Gimbernat's ligament that crural hernia uniformly occurs. Writers on surgical anatomy, by adopting anatomical hypotheses in respect to the structure of the parts, have greatly embarassed the subject, and tended much to confuse the student. In the following description we shall endenyour to avoid this as much as possible, admitting, however, that the minute anatomical views of Hesselbach may be examined with advantage by the surgeon. We have already recommended the student to strip off the peritoneum from all these surfaces, and to reflect it towards the pelvis; he will next come to a layer of very loose cellular substance connecting this membrane to the fascise and to the shouth of the vessels. Having removed this, the fascine present themselves, and the aheath of the great ressels. Upon the inside the sheath, or towards the pubes, many have thought that the fiscia transversalis is altogether wanting, but this seems to be an error; the fascia is much thinner immediately to the inside of the vessels, where, however, it passes over an opening down which the trural hernia uniformly passes. As the fascia transversalis passes over this opening, it is not unfrequently still farther strengthened by a layer of cellular substance, which together form the septem centrale of the French anatomists. fascia now covers the inside of Gimbernat's ligament, and frequently forms upon this surface a crescent-shaped membrane doubling the ligament of Gimbernat, and having precisely its form; this doubling of Gimbernat's ligament by another structure, was particularly described by Hesselbach. If the student now push a portion of the peritoneum with his finger downwards, so as to imitate a hernia, he will find that the finger, pushing the peritoceum before it, has passed into a rounded aperture, (superior critice of the crural canal,) and has pushed before it the representation, which thus, unless it should give way, must become the fascia propria of every crural hernia. Sir A. Cooper speaks of the crural hernia descending in the sheath of the yessols: I cannot say that I ever examined a case of this kind. The boundaries of this opening are superiorly Poupart's ligament; externally the great voin enclosed by its sheath; inferiorly the horizontal raisus of the pubes; internally the semilunar edge of Gimbernat's ligament, and of its daubling already described, when such a structure happens to be present. It is here, i.e. in this ring, that I have always noticed the stricture in strangulated crural hernia to be placed, and it is obvious that some part or other of the ring must be cut by the surgion in order to relieve the strangulation; now, the only parts which can be conveniently cut, are, 1". Poupart's ligament, by cutting directly upwards, 27. Gimbernat's ligament by cutting horizontally inwards. Timid surgeons whose knowledge of anatomy is unsound, usually out Poupart's ligament; experienced surgeons divide or rather scratch through a partion of Gimbernat's ligament: the neck of the sac is of course out in both cases. Let the student now continue to push his finger still further down towards the thigh, imitating the course of the femoral hernin, he will now find that it has passed underneath the cribriform fascia. In this situation it usually remains, or at least I have always seen it so, but it may, of course, in certain cases, enlarge and escape through some of the openings in the cribtiform fascia, and thus become ultimately almost subgutaneous; I have never seen a case of this kind, the hernial sac appearing to me to be always invested by the cribriform fascia. In this situation the pressure on it being but feeble, the hernin, so soon as it escapes from below Poupart's ligament expands, and rising upwards, govers partially Poupart's ligament, so that at first it is occasionally a somewhat difficult matter to decide on We may further remark, that on every. its real nature. occasion of dissecting these parts whether in the male or female, whether in the recent or old hernia, we have uniformly found a sephen or partition of dense cellular substance between the san and the femoral yein-

378. ARTERIES AND VEINS OF THE ABBONES AND ETS VISCENA. To do justice to these, the student will

require to devote an abdominal cavity to their exclusive examination. Neither can be even then but with some difficulty dissect them in any systematic way. 1°. Those arteries supplying the anterior walls of the abdomes are chiady the internal mammary, the epigastric and the circumflex arteries of the ileum; the phrenic arteries supply the diaphragm, the lumbar arteries the posterior and lateral walls of the abdomen. 25. On laying open the cavity of the abdomen, the arteries which fall most conveniently to be first examined are the superior mesenteric, the inferior mesenteric, then the coeline axis and its branches, and, lastly, the phrenic, capsular, renal, lumbar, spermatic, acrta itself, and illaes. We recommend to the student, however, to dissect these vessels, and also the nerves, in a sytematic manner, as being the only safe way of proceeding, and to enable him to do so, have permission from his fellow-students (in case the parts do not belong to him,) to cut down the walls of the thorax so low as to allow him easily to get at the lower portion of the thoracic sorts, trace this arrery into the abdomen behind the diaphragm; cut away so much of this muscle as may be required, and cleaning the gallet, the commencement of the abdominal norta, proceed to trace its branches exactly in the order in which they come off from it. In this way we shall examine them; all other methods, however convenient they may be with reference to a scarcity of subjects, cannot fail greatly to embaruss the student.

379. The Announced Asura is a continuation of the thoracic portion of the aorta; it receives the name at the moment of its passage behind the diaphragm, and retains it until its subdivision into the common ilimes, which usually happens about the lower part of the fourth lumbar vertebra. We shall first describe the branches of this great vessel, since the main trank cannot well be seen until the removal of nearly all the viscora. Begin with.

880. The Inventor Pierres: Arrents. The Right Phrenic Artery generally comes off from the north by itself, sometimes along with the left, necessionally from the coline artery. It immediately ascends a little outwards, along the free edge of the right erus of that muscle, to which it gives several twigs, as well as to the supra-renal

cansules, the passerers, and the liner. It then divides into The auterior branch gives off at its comtwo branches. mencement a transverse twig, which unites before the esophagus with a similar twig of the left phrenic artory. It then traverses the adhesion of the liver to the diaphragm, gains the neighbourhood of the vena cava inferior, sends several ramifications to the pericardium, through the displiragm, and separates into a great number of secondary branches which lose themselves in that muscle, communicating with the corresponding superior phrenic. Others penetrate into the posterior part of the liver. One of them, which seems to be the continuation of the original trank, turns over the central aponeurosis, and anastomores with the left phrenic. External branch. Directed transversely outwards, above the liver, behind the right lobe of the aponeurosis of the disphragm, it terminates in the digitations by which the disphragm is attached to the ribs. It furnishes two or three toigs to the supra-renal capsule (superior capsular arteries), and, by those which are diffused in the muscle; it anastomoses with the other branch, and with the inferior intercestal and lumber arteries. The Left Phrenic Artery has a distribution aimilar in most respects to the right. The next artery given off by the north, is,

381. The COLLIAC ARTERY OF Axis. It must be traced very carefully, and if possible none of the viscera removed until all its branches have been examined The Caliac Artery (Art. cachea) is the shortest of the arteries which the abdominal aorta furnishes. It comes off at a right angle, between the crura of the disphragm, opposite the union of the last vertebra of the back with the first of the loins. It is directed borizontally forwards and to the right, in the posterior separation of the two laminas of the hepato-gastric omentum. It corresponds, above, to the left side of the small lobe of the liver; below, to the upper edge of the pancreas, on which it rests; to the left, to the cardia; to the right, to a pretty considerable space which separates it from the pylorus. This artery sometimes furnishes the cansular or the inferior phrenie. But it always separates after a course of about half an inch, into three brunches of unequal size, which are, 1°, the Coronary artery of the stomach, 2', the Hepatic artery, and, 3', the

Splenic artery.

A. CORONARY ARTERY of the STOMACH (Art. Corannels erstriculi.) The smallest of the three arising from the coline, directs itself upwards, forwards, and to the left, approaching the cardia, over the right side of which it bends downwards to follow the small curve of the stomach, to mur the pylorus, where it anastomoses with the pyloric artery. In this second parts of its course, it occupies the interval which the two laminar of the hepato-gastric omentum leave between them, when they are reflected over the stomach. The branches which it gives off may be distinguished into resophagenl and gastric. (Esophageal Branches. They vary in number, and are either vertical or transverse. Frequently there is only one of the former. Arising from the bend which the artery forms near the cardia, it ascends upon the asophagus, which it follows to a considerable distance in the posterior mediastinum, and is distributed to its walls by a great number of flexuous twigs, which anastomose with the acrtic osophageal arteries. If there he two or a greater number, they follow precisely the same course. The transverse branches surround the cardia in a semicircular manner. Some of them subdivide on the widest part of the resophagua; the others extend as far as the great cul-de-sac of the stomach, and there anastomose with the vasa brevia. Gastric Brancher.-They come off along the small curvature of the stomach, and pass over the two surfaces of that viscos. Their number is irregular, and their size very variable. They separate into a great quantity of flexuous twigs, which rumify between the muscular and murous coats of the stomach, and anastomose with each other, and with the gastro-coiploie arteries. The coronary artery often sends a considerable branch to the liver.

a. Heraric Aurian (Arteria hepatica). Much larger than the preceding, it directs itself transversely to the right and forwards under the small lobe of the liver to near the pylorus, whence it slightly ascends towards the neek of the gall-bladder, and the transverse fissure of the liver. In this course it furnishes only two branches, the pyloric and right gastro-

epiploic. Paloric Arlery (Ar. pylorica.) It arises from the anterior part of the hepatic, on the right side of the pylorus, whence it ascends, from right to loft, along the small curvature of the stomach, to anastomose with the termination of the coronary artery of the stomach, after a mourse of greater or less length. It gives to the two surfaces of the stomach and to the pylorus twigs, which inosculate with those of the right gastro-epiploic artery. Arter. gastrica daudenalis, by some called the gastroemiploing device. It arises to the right of the pylarus and beneath it, from the lower part of the hepatic. Its size is considerable. It descends at first vertically behind the stomach towards its great curvature, applied posteriorly upon the second portion of the dundenum, and covered to the left by the panereas. In this course it gives off two or three small branches to the pylorus and pancreas. (arter. pylor. inferiores.) It soon divides into two principal branches, viz. the gastro-epiplolea dextra and panereatica duodenalis. The first of these, which is really the continuation of the main trunk, proceeds from right to left along the great curvature of the stomach, between the layers of the anterior lamina of the great omentum, as far as the middle part of that ourvature, where it inosculates with the left gastro-epiploie artery. The branches of the panerestico-duodenalis are distributed to the walls of the duodenum, and the properior surface of the pancreas. In its horizontal portion, along the great curvature of the stomach, the gastroopiploien dextra gives off, superiorly, numerous twigs, which ascend in a flexuous manner over the two surfaces of that viscos, and anastomese with those of the pyloric artery and coronary artery of the stomach. Inferiurly, it sends off some which descend vertically between the laminae of the great omentum, and gain, by being reflected in the posterior lamina, the edge of the arch of the colon, where they inosculate with the colic When the hepatic artery has furnished these two arteries, it ascends, before the venn portie, and on the left of the bepatic duct, to the right sale of the lobulus Spigelii of the liver, and in the transverse fissure of the liver divides into two considerable branches, a right and a left. Right Branch, (art. kepatica dextra). Directed upwards and outwards, it crosses the direction of the hepatic duct, heyond which it furnishes the cystic artery (art. cystica), which gains the neek of the gall-bladder, and spreads out in the lower part of the walls of that reservoir, where it winds for some time between the scrous and muccus membranes of which it is composed. The cystic artery, moreover, sends a very considerable twig between the liver and gall-bladder, to be distributed in the substance of both. After the origin of the cystic artery, the right branch of the hepatic artery dives into the transverse fissure of the liver, and loses itself by ramifying in its right lobe. Left Branch (art. hepatica sixistra). Proceeding obliquely upwards and inwards, it enters the transverse fissure and loses itself in the left lobe and in the lobulus Spigelii of the liver, accompanying the divisions of the vena ports.

c. The Spierce Artery, in the adult, is larger than the hepatic, but smaller in the child. At its nammencement, it passes from right to left in a tortuous manner along the upper part of the paneress, which lodges it in a particular grouve. It thus arrives at the fissure of the spleen, after formishing several branches, which are the following. Pancreatic Branckes, (art. puncreatica media et sinistere). They come off, in irregular number, from the lower part of the splanic artery, dive perpendicularly into the substance of the panereas, and there subdivide, to be united with the twigs of panereatic artery famished by the right gastro-epiploic. Left Gastro-epiploic Branch, (ant, gustre-epiploica simistra), arises from the trunk of the splenic artery, or only from one of the branches by which it terminates. Its size is generally equal to that of the right gastro-epiploie; but it is frequently much larger, so us to appear to form the true continuation of the arrary which gives rise to it, having its direction changed. It ascends at first a little to the left towards the great extremity of the stomach, is concealed for some time by it, and then descends along the great curvature. At its commencement, it sends some ramifications into the panereas; but along the great curvature it sends upwards, over the two surfaces of the stomach, and downwards, into the great umentum, twigs of larger size, which are distributed procisely in the same mannes as those of the right gastro-epiploic artery, with

which it anustomoses toward the middle of the great curvature. At some distance from the fissure of the spleen, the artery divides into two or three branches, which subdivide into seven or eight twigs, which diverge from each other, before entering the inner surface of the spleen. They penetrate into that viscus by so many separate apertures which are observed along its fissure, presently subdivide to infinity, anastomosing with each other by arches, and seem in a great measure to constitute the proper tissue of the organ. Final Brevia .- These are large but short twigs, which come from the terminating branches of the splenic artery before their entrance into the spleen, and immediately pass to the large extremity of the stomach, near the cardia, expanding over the two surfaces of that organ, and anastomosing with the transverse occuphageal twigs of the coronary artery. In this manner, they serve to complete the arterial circle which surrounds the cardia. The student will now find it must convenient to proceed with the dissection of

382. The Superior Mesenteric Artery (art. mesornica superior). It arises from the anterior and right side of the agree, a short way below the codiac, which it almost equals in size, but greatly exceeds in length. It immediately ascends a little to the left and forwards, belief the panereas, and before the third portion of the doudenom, and passing behind the left. part of the transverse mesocolon, goes to the upper extremity of the mesentery, between the two folds of which it enters, directing itself downwards and to the right. and describing an elongated curve, the concexity of which is turned to the left and forwards, and approaches so much nearer the intestine the lower it is examined. Towards the end of the ileum, the superior mesenteric arrays, now become slender, anastomoses with the inferior branch of the ilco-colic artery. Near its origin, it gives off some small, branches to the doodenum and panereas, and communicates with twigs of the splenic and hepatic arteries. In the mesentery, it formishes many large branches, distinguished into those arising from its ownersity, and those from its ownersity. 15. Branches given off from its commavity (Right colic artsrier). (Art. Colina Media), arise from the right and somewhat anterior part of the superior mesenteric artery, when the latter passes the transverse mesocolon. It proceeds from behind forwards, between its two laminse, and runs horizontally to near the middle part of the arch of the colon; there, it divides into two branches, which separate from each other to right and left, forming a more or less open angle. The right branch runs along the right part of the arch of the colon, and anastomoses with a twig of the middle right culic artery. The left follows the corresponding part of the same intestine, and in the lumbar region inosculates with the ascending branch of the superior left colic artery. Art. Colica Dexten. It arises a little beneath the preceding, which sometimes furnishes it, and directs itself obliquely to the right, forwards and a little upwards in the mesocolon. On arriving near the upper part of the right lumbur colon, it divides, like the preceding into two branches, one of which bends to the left and inosculates with the right branch of the superior colle artery, while the other descends to unite with the ascending twig of the ilea-colic artery. Art. Hea-Colica larger than the preceding, near which it is found at its commencement. Directed transversely to the right in the meso-colon, it divides, near the execum, into three branches. The first bends from beneath upwards, and communicates with the descending branch of the right colic artery. The second descends in the mesentery. and unites with the extremity of the superior mesenteric artery itself. The third is transverse, and arises from the angle of the other two; it gains the posterior part of the colon and occum, where these two intestines communicate. From thence it sends a small twig, into the peritoneal field of the vermiform appendage. It then separates into two branches, of which one ascends behind the colon, while the other descends behind the erroum. Its twigs belong to the walls of these intestines. In anastomosing with each other, as we have pointed nut, the right colic arteries form distinct arches. whose convexity is turned towards the intestine. These arches give off on twigs by their concavity, but by their convenity they send off a very great number. These, for the most part, on leaving the arches, direct themselves parallel to each other as far as the colon; but

acceral of them, following an oblique direction, meet and anastomose so as to constitute arcule of various forms, whence arise other secondary twigs which go directly to the intestine. When they have all arrived there, they sulafivide, upon its two surfaces, into slender twigs which dive beneath the serous cost, and form a very fine net-work in the other coats. Those which belong to the esecum are much closer and more numerous than those of the colon. Branches acting from the convexity of the superior invientaria artery commouly from fifteen to twenty. Their volume and length diminish from the upper towards the lower, which are mere twigs. They all direct thomselves some or less obliquely downwards and to the left between the two laming of the mesentery, towards the small intesting, for which they are destined, as well as for the lower third of the duodenum. At the end of a rather short course, each of them divides into two twigs which separate from each other, and unite by arches with those of the neighbouring branches. From the convexity of these primary probes, there arise other smaller twigs, which presently divide in the same manney, and constitute secondary arches by new amstomuses similar to the first. These second arches in like manner give rise to other twigs which form third arches; and from these again come off others of a fourth order, which themselves produce a fifth, quite close to the intestine, these twigs thus constitute in the insentery a kind of net-work, of which the very numerous arealse vary in their form and size. These arealm are themselves traversed by very delicate twigs which go from one branch to another, and which by the way give ramifications to the mesentery and its lymphatic glands. Near the edge of the small intestines, in the place where the two lamine of the mesentery leave a triangular interval between them, the vascular not-work, which we have described, abruptly ceases, and furnishes a great number of small parallel twigs, which proceed directly over the two surfaces of the intestine, and pass into the celinlar tissue between the murous and muscular costs, where they ramify and sublivide to infinity, taking the appearance of small shrubs. When they have arrived at the ennyes edge of the intestine, those of one side anastomose with those of the opposite side, in such a manner as to represent rings. The capillary ramifications, which the mucous membrane receives from all those branches, form at its surface a net-work of the greatest delicary, which spreads out in the valvalue conviventes and in the villasities which it presents. By laying the mesentery, and with it the whole trace of the small intestines over to the right side, the course of

the next artery may readily be traced.

383. The INTERIOR MESENTERIC ARTERY, somewhat smaller than the superior, arises much lower from the anterior and left part of the aerta, at the distance of an inch and a half from its termination. It descends at first a little to the left, behind the lamina of the peritoneum, which goes to form the corresponding lumina of the mesentery, then bending to the right, it enters into the substance of the ilian mesocolon, forming a much less extended curve than that of the superior mesenteric artery, and whose convexity also looks to the left. Arrived at the brim of the pelvis, it prolongs itself into the posterior separation of the mesorertam, and reaches near to the anus. The concavity of the curve formed by the inferior mesenteric artery produces no branch, but there issue a great number from its convexity. these the four principal branches have received the name of Left Colic, Superior and Inferior Sigmoid artsvies and Superior Hazmerhoidal.

A. LEFT COLD ARTERY arises opposite the bifurcation of the aorta. Directed almost transversely to the left it arrives near the lumbar colon of the same side, and there separates into two branches, one of which accends as far as the arch of the colon, and anastomeses with the left branch of the middle colic (a branch of the superior mesenteric), while the other descends in

the iline mesocolon, and inosculates with

B. The Screenon Stomorn Anyers often arises from the preceding, sometimes wanting. It directs itself towards the first curve of the sigmoid flexure of the colon, and there divides into two branches, one of which ascends to form an arch with the descending branch of the superior left colic artery, while the other units with one of the branches of

c. The ISPERSON STREET ARTERS PASSES towards

the middle part of the sigmoid flexure and separates into two branches. The upper excends to form an arch with the preceding. The lower descends to unite with one of the twigs furnished in the mesa-rectum by the inferior mesenteric artery itself. These colic arteries, on arriving at the intestine, exhibit precisely the same arrangement as the colic branches of the superior mesenteric; that is to say, after forming arches to which succeed some arcolle, they send, over the two surfaces of the colon, twigs at first parallel, and afterwards divided a great number of times. After farmishing these arteries, the inferior mesenteric gives off some small, and in all respects very irregular arteries, and presently after divides into one or two branches.

D. The Superston Harmonnuorpal Asteries deseemd along the posterior surface of the recrum, at first superficial, soon emoral themselves in the layer of longitudinal fieshy fibres of the intestine, progressively diminish in size, and end by minute twigs, after giving off laterally a great number which embrace from behind forwards the rireumference of the rectum, and anustomose on its fore part with each other and with the middle and inferior hasmorrhoidal arteries; some twigs leave the rectum upon its sides, and go to communicate with the lateral sacral arteries. Their terminating branches approach to within a short distance of the anns; they can only be examined along with the anatomy of the rectum after a lateral section of the polvis has been made. The student may now remove the viscora to which the branches of the collar, superior mesent-ricand inferior meanteric arteries proceeded (with the exception of the rectum which must be left in its place. for future examination); this will enable him to clean the main trunk, i. c. the norts, and all the remaining branches it gives off. These are mostly lateral, and proceed either to certain viscera, or to the walls of the abdomen.

384. Carsular Arrentes. These arteries are turn in number, one on each side, and are called saiddle to distinguish them from those which the phrenic above, and the renal below, send to the supra-renal capsules. Their size is inconsiderable, and they come off from the lateral parts of the arren a little above the renal arteries. Sometimes they come from the cadine trank. Directed transversely over the sides of the vertebral column, they gam the anterior edge of the capsules, and divide into several branches which spread out upon the two surfaces of these organs, and ramily in their substances. Before arriving at the supra-renal capsules, they frequently soul several small twigs to the crura of the disphragm, and to the mass of adipose collular tissue which envelops the kidneys. The left, moreover, gives some traign to the colon and spleen;

the right to the duodenum and liver.

385. The Renal of Emplored Arteries. Of large size, short, and generally two in number, one on each side, they came off below the capsular arteries and the superior mesenteric, forming with the aurta an angle approaching more or less to a right one. The left is commonly a little more anterior and higher than the right. Immersed in abundant adipose celiniar tissue, directed transversely over the sides of the bodies of the vertebra, covered by the renal vein and peritoneum on both sides, and, on the right only, by the vena rava inferior, they arrive, after a short course, at the fissure of the kidneys, where they divide each into two, three, or four large branches. Before arriving at the kidney, they give off only some alender twigs, which ascend towards the supra-renal cupsules, or lose themselves, under the name of Adiport Arbeits, in the surrounting fat. They also, however, frequently furnish the apermatic arteries. The three or four branches which terminate each renal artery separate from each other, and easter the kidney, between the polvis, which is behind and below, and the roots of the ronal vein, which are before. They divide into a considerable number of twigs which pass between the walls of the pelvis and parenchyma of the kidney, and subdivide around the calvees into a number of small twice. These pass round each of the bundles of tubes which are to form one of the mammilhe of the kidney, and anastorsoso with each other so as to constitute a distinet arely the convexity of which is turned towards the cortical substance, which weeker a great number of ramifications from it. In some aubjects there are three or four round arteries on each side; but this arrangement is not of frequent occurrence.

386. The Spenmarn: Abteries. Ome on oach side, slender and of great length, they come off from the anterior or lateral parts of the aurta, and sometimes from the renal arteries. They do not always both come off from the aurta at the same level, but protty frequently one of them is higher than the other. In all cases forming with it an acute angle below, they descend almost vertically, and only a little outwards, over the sides of the vertebral column, before the pune muscles and wreters, whose direction they cross, and behind the perstoneum. The right passes, murrower, tackwards, or before the venu enva inferior. Their course is extremely flexuous. They are presently after united to the spermatic veins, and distributed very differently in the male and in the female; after previously giving off, in other sex, very small twigs to the fat and lymphatic glands of the surrounding parts, as well as to the walls of the writers and to the peritoneum. In the Male, the specimatic artery, placed beside the vas delerens, issues by the inguinal ring, and is distributed to the testicles, giving off by the way ramifications to the different parts which constitate the spermatic chord. At its terminathm, it divides into two bundles of twigs, one of which goes to the epididymis, the other to the toxticle. The first penetrate by the head of the epididymis, are expanded in that body, and give some ramifications to the tunion nibuginea and the substance of the testicle. The others panetrate into the testicle by its appearedge, and give to the tunica albugines a great quantity of conflications, which afterwards lose themselves upon the library septalying between the masses of the permatic ducts. In the Female, after ermsing the odge of the poore mostle, the spermatic artery dives into the pelvis and goes to the overy, hence called someon ordery. Most of its twigs lose themselves in the times of that organ. The others are distributed in the Falloplan take, the round ligament, and on the sides of the uterus, where they anastomose with the opering arreviou.

387. The LUMBAR ANYMARS are commonly four on each side. Five, however, are not unfrequently met with, and sometimes only three. Their size is always greater than that of the interesstal arteries. They come off as much from the posterior part as

from the sides of the nortz, and direct themselves more or less transversely outwards over the middle of the bodies of the first four lumbar vertebra, being covered by the passas magnus, or by the crura of the disphragm. At the base of the transverse processes, they divide into a dorsal or posterior branch, and an anterior or lumbar branch, properly so called, after sometimes giving a few small twigs to the bodies of the vertebra, the cellular tissue, and the lymphatic glands of the loins, the crura of the diaphragm, and psous muscles. The dorsal branches of the four lumbar arteries are very slender. They send at first into the versebral eanal a twig which is distributed to the spinal marrow and its envelopes, and then dive into the substance of the fleshy mass of the szero-humbalis, and longissimus dorsi muscles, where they lose themselves, sending some ramifications into the intertransversales and multifidus spine muscles, and into the integuments. They anastomese with each other. First Lamber Artery. It directs itself outwards, under the lower edge of the twelfth rib, following exactly the attachment of the disphragm. It then bends downwards, and descende almost vertically between the peritoneum and transversus abdomim's muscle, in which latter it loses itself. S-coud Laurbar Artery. Its auterior branch, which is of small size, despends in the substance of the quadratus lumberum and ramifies there. Third Lambur Artery. Its anterior branch, which is very large, dives between the quadratus lumborum and transversus abdominis muscles, beads towards the iline crest, and divides, towards the posterior third of the latter, into two large twigs, which pass through the broad muscles of the abdomen near their origins, and descend backwards into the gintri muscles, where they communicate with the twigs of the glotteal artery. Fourth Lumbar Artery. anterior branch, which is still larger than that of the preceding, directs itself transversely between the psous magnus and quadratus humborum, along the inferior attachment of the latter, gives large twigs to the illnens muscle, passes above the Illan crest, and is equally dispersed in the gluttei muscles.

388. The continuation of the abdominal meris may now be traced. It follows pretty nearly the course

of the vertebral column, from where it passes between the crora of the diaphragm to its ultimate division into the common illacs, opposite to the inferior part of the fourth lumbur vertebra. The omenta stomach, large and small intestines lie in front of it, also many of the great arteries we have just described. But notwithstanding, the corta in thin persons is comparatively near the surface of the body where placed on the third and fourth lumbar vertebrae. The thoracie duct and vana azygos generally pass with it behind the disphragm. A great portion of the abdominal aorta is cuvered by the mesentery, the vena cara abdominalis is situated to the right side, and both vessels are enclused by a sheath of cellular substance, in which also are many lymphatic vessels, glands, and branches of the sympathetic nerves. Moreover, in its course downwards, it is crossed by the vena portarum between the first and second lumbar vertebrae, by the pancreas, by the duodenam and left emulgent vein. The arteria sugri media which some consider as a branch of the abdominal norta, will be examined along with the arteries of the pelvis. (For the anatomy of the abdominal veins, and of the vena portie, see the section treating of the veins.) The anatomy of the nerves of this region will he most conveniently dissected and examined along with those of the pelvis; we shall therefore delay their consideration for a little, and proceed with the auntomy of

389. The Pervic Viscent. The subject must be put as in the situation for the operation of lithotomy, and a thin block placed under the pelvis; a grooved staff introduced by the crethra into the bladder, and secured there, and the scrotum well raised up with hooks; this exposes the perimeum. The Perceawn is bounded in front by the scrotum, behind and at the sides by the coccyx and sacro-scintic ligaments and tuberosities of the ischium; laterally, but more forward, by the rami of the pubis and of the ischium. The integuments are tense, thin, and stretched as it were across this space, and are, like the serutum, of a darker colour than in other parts of the budy; along the mestal plane extends a raphe, which may also be traced over the serotum and lower surface of the peaks. Dissect off the integuments of this region by two Haps, to be reflected outwards

towards the thighs and inhorosities of the ischool: this dissection exposes the superficial perment fareio. This fisein is an exceedingly important part; anteriorly, it is continuous with the darten, or at least with that layer of the scrotom which corresponds to the superficial fases of the abdomen; laterally, it extends to the thighs, after being attached to the rami of the pulses and ischion a posteriorly, it procools to the verge of the anns, where it degenerates into know redular tissue, proceeding to the right and left of the termination of the gut. Divide the facin into two by a vertical incision, and reflect its sections towards the tuberosities of the isobion. This exposes the fascia propria of the muscles, which the French anatomists have called the middle perincal fuscio; but the name is not a good one, neither can there be any occasion for distinguishing it by a particular name: remove this fascia carefully from all it covers, likewise clean the surface of the sphineter of the arms. The parts thus exposed are, Ist, muscles; 2d, other parts. The muscles are the sphincter ani, the erectores penis, the acceleratores arms, the transversales perimei. The other parts are, a portion of the prethra, the central point of the perincoun, the ischio-rectal space, and some branches of the common pudic arteries, weins, and nerves.

390. The Seurscrea Avi is usually divided into two parts, an external sphinoter and an internal. The sphincter externor is an oval membranous musele surrounding the nous. It is attached to the tip of the conceys by a sort of cellular tendon, from which two fleshy bundles arise, ubich, passing round the sides of the anny, unite again before it to form a fleshy point, which is partly confounded with the accelerator uring, and partly expanded in the cellular tissue, more especially into that part of it called the central point of the perinasum. The fibres of this muscle are concentrie and semi-elliptical, and interlaced with each other in the median line, forming acute angles. Within this a thick fleshy bundle close to the macous assurbrane surrounds the anus; these have no attachment to the energies homes posteriorly; this is the sphincler interwas. In the female its anterior portion is much more

rounded than in the male. The infloring surface of the externus is covered by the skip. The upper corresponds to the levator ani, from which it is almost every where separated by cellular tissue, but with which it is intimately confounded near the rectum. Autororly, it also unites in part with the accelerator uring and transversus perions. This muscle closes the anus, and wrinkles the surrounding skip. In the male, it draws

the bulb of the urethra backwards.

391. The Engeron Perets (Inchin-Covernous) is a small elongated that muscle, broader in the middle than at its extremities, which surrounds the origin of the corpus cavernosum. Fixed to the inner side of the sciatle tuberosity, it ascends forwards and inwards, and dependences into a white and strong aponeurosis, identified, beyond the level of the bulb of the arethra, with the fibrous membrane of the corpus cavernosum, over which it is applied by its outer surface, which moreover corresponds to the ranges of the ischium, while its inner surface is in connexion with the transverse perium and accelerator uring, from which it is separated by much adiptose cellular tissue, together with vessels and nerves. It draws the root of the penis downwards and bookwards.

392. The Accelerator Uring of Bulbo-Caven-NOSES is long, flat, broader behind than before, and situated in the perincom, beneath the bulb of the urethra and the root of the penis. A raphe extends inferiorly along the mesial line of the arothra as far back as the central point of the perinaum; this raphe is tendinous, and there the muscles of the opposite sides user, and are firmly attached. From this, which for the sake of the description we may call the origin of the muscle, the muscular fibres proceed outwards and upwards, to terminate by being inserted, 1st, into the fibrous membrane of the corpus cavernosom; 2d, a few into the deep perinseal fascia; 3d, into a tendon which is common to the musele of the opposite side, and lies above the arethra. The upper curface of this muscle covers the bulb, and the commencement of the spongy purtion of the neethra, as well as the corpus cavernosum. The laner is covered by the skin, the splineter ani, and the erector panis, from which it is separated by much cellular tissue. This muscle compresses the puntarior part of the canal of the arethra, which it carries backwards and upwards. It accelerates the ejection

of the arine and seminal fluid.

393. The Transvensus Persuat is a small, flat, thin, irregular muscle, varying much in form, more commonly triangular, sometimes composed of several separate bundles, and situated at the posterior part of the perincents. It is often wanting in women. It arises, by short aponeuroses, from the inner part of the tuberosity and the ramus of the inchium, above the erector penis and root of the corpus cavernosum, directs itself inwards and a little forwards, and terminates at a tendinous line placed between it and its fellow, being also in part confounded with the accelerator uring and sphineter ani, and in the female with the constrictor vaging also. Sometimes all its fibres unite with the porelerator urime; they are always longer behind and below than before and above. The anterior surface of the transversus perinesi, which is inclined downwards, corresponds to the erector penis and accelerator urine, and a mass of cellular tissue, which fills up their interval. The porterior surface is covered by the levator ani, from which it is separated by much cellular tissue, and externally by the doep branch of the internal pudic artery. It concurs with the accelerator urings, to compress the wrether; and with the levator ani, it supports the lower part of the rectum and the bladder. Santorini described all these muscles with more care than modern anatomists; he also pointed out the frequent occurrence of a second transversus muscle (transvers, perimei alter), arising like the former, but uniting itself to the accelerator muscle. The student may now examine this dissection, with a reference to the other parts spoken of; 1st, the triangular space bounded by the accelerator urinas, crector penis, and transversus muscles. In the lower part or base of this space, on the lelk side, the surgeon must readily cuts into the urethra in lithotomy, feeling first for the grouve in the staff. By a little dissection carried into the deepest part of the space, the student will readily find the sub-pubic triangular membrane through which the urethra runs,

2d, By dissecting through or behind the crector penis on either side, he may examine the position of the common pudic artery, and the coming off of certain of its branches, particularly the artery of the bulb, 3d, Divide the raphe, uniting the acceleratores muscles to each other, and by this means expanine the bulb of the urethra, and its connection with the central point of the perincum. 4th, Between the tuberesity of the ischium on each side, and the anus and rectum which necepy the mesial line of the pelvis, is the ischio-rectal space. This is not important surgically; but by clearing away the fat and cellular substance which here abound, the student will reach the inner side of the obturator internus muscle and the outer side of the levator ani, both being covered by a fascia, which will altimately be traced to the pelvic fascia. He may even clean the outer surface of the levator and, and take a view of the muscle from this side. Lastly, by detaching the left cros penis from the ranns of the pubes and ischion, also the erector penis, he may better expose the anterior surface of the sub-pubic triangular membrane, and see the urethra passing through By this incision, he also exposes the deep suspensory ligament of the penis, the dursal and central arteries, and the vena dorsalis. It has been recommended to divide the central point in the perinarum, and thereby expose the inferior fundus of the bladder and the prostate gland, but this view could only benefit the very advanced student. We have very carefully described the sub-pubic triangular membrane, (note to 151), and the student would do well to revert to that description, and to the engravings of the ligaments. The points most worthy of his attention at present are, the passage of the wrethra through the membrane, the layer which it detaches anteriorly along the surface of the urethra, towards the bulb, and the glands of Cowper, which may either be exposed now, by cutting through a portion of the membrane, or left to be dissected afterwards, when the lateral section of the pelvis has been made.

394. LATERAL SECTION OF THE PELVIS. Divide the left pubis vertically with a saw, at the distance of about three-fourths of an inch from the symphysis, and detach the remains of the left or innominatum, by

equenting the sacro-iliae articulation; leave all the soft parts, if possible, within the polvis connected with the opposite side; and having distended the bladder and rectum, clean cautionaly the whole of the surfaces, taking care to preserve every important part. When this is done, the student ought to review the position of all the parts displayed with the greatest attention. Commence with the peritonnum, tracing it from the walls of the abdomen upon the surface of the superior fundus of the bladder, a limb of the sides, and the posterior surface where the bladder faces the regtam ; observing, at the same time, that all the anterior surface, the neck, a great deal of the lateral regions, and all the inferior surface, are emirely without any peritoneal covering. Next trace this membrane, where it forms the deep cul-de-sac between the bladder and the rectum, marking the point of its reflexion from the one organ to the other, and the formation of the meso-rectum, by which about three inclose of the lower part of the rectum is altogether without a peritoneal covering; likewise that the back part of the rectum is equally uncovered by it. Next examine the pelvic fascia of the left side. A better view of this fascia will be afterwards obtained in disserting the right side of the pelvis; in the mean time may be naticed, the detacked portion which lined the incide of the left obturntor and levator ani muscles, and which being reflected from the walls of the polyis upon the viscera, nearly upon a level with the upper surface of the presentegland, transmits a lamina (worked figures) over the surface of the bladder, encloses the prostate, sends a partition between the prostate, bladder, and rectum, and finally encloses the rectum (recial fascin). Dissect off a small portion of the vesical fascia, in order to examine its strength and attachments; lay open the rectal fasein by a tongitudinal meision, and clean the criesnal or longitudinal muscular tunio; clean the ureter and yas deferens, and trace the former to the bladder, the latter to the bank of the prostate gland; dissect between the mustate, bladder, and rectum, and drawing the former upwards, expuse the youldn't seminals hou of the loft side, then the fundes of the bladder, and ness the was deferent and seminal vericula of

the right side. It is at the back of the prostate that the bladder may be punctured through the rectum. The position and saze of the Prestate Gland must next be adverted to and its surgical anatomy. The way in which it surrounds the neck of the blobber and commencement of the urethrn, the firmness it gives to these parts, the consequent danger and impropriety of outting it through and through in lithotomy, the laming it receives from the sub-pubic triangular membrane. The left levator and muscle should also be attended to, and baid up and down, so as rightly to understand the indireet support it gives the prostate gland and bladder. and the more intimate union it has with the pouch of the rectum. In front of the prostate is the membranone part of the urothra and the glassis of Cowper; these will be more particularly examined afterwards.

395. The LEVATORES URETHRE, or myseles of Mr. Wilson, must be examined at this stage of the dissection. These muscles, viewed by Albinus as a portion of the levatores ani, are yet generally distinct. They arise narrow and tendinous on the inside the symphysis pubis, beneath the anterior ligaments of the bladder; running parallel with its fellow, they both descend, fleshy and increasing in breadth, until they reach the sides of the membranous portion of the canal of the urethra where they surround and embrace it, inferiorly connected with each other and the central point of the perinsenus. They elevate, compress, and probably occasionally contract the urethraat its narrowest part, and it is also possible, that by spasm or otherwise, they may sometimes offer obstacles to the passage of the staff or eatherer. Mr. Guthrie has given a more complicated view of these muscles; this distinguished surgeon being of opinion, that anatomists have only described half a muscle, forgetting the lateral connection it has on each side with the ramus of the pubis. The fibres shewn the author by Mr. Gutlerie, appeared to resemble rather an elastic and vascular tissue than a muscular structure, but the antiject may have been an unfavourable one, having been preserved in alcohol. Finally, the student may now review the position of the bulb of the grethen and its surgical anatomy, with great advantage. The most advantageous time for examining the anatomy of the rectum is also at this stage of the dissection.

396. The RECTUM occupies the posterior part of the pelvis, and terminates the digestive canal. It succeeds the sigmoid flexure of the colon, and extends from the left side of the sacro-vertebral articulation to the summit of the coccyx, where it opens externally. It is a little inclined from left to right at its commencement; but afterwards follows the median line of the body nearly in a vertical direction, accommodating itself to the curve of the sacrum, and thus describing a curve, the general concavity of which is anterior. Frequently also it presents lateral reflections more or less distinct, It is cylindrical in the greater part of its extent; but, near its inferior extremity, particularly in the adult, commonly presents a more or less considerable expansion. Less voluminous than the creeum and colon, it is yet susceptible of very great dilatation, and does not present at its surface either bulgings or muscular bands; only in the state of vacuity, it is marked with some irregular transverse wrinkles, which arise from the falling in of its walls. The rectum being immoveably fixed in its place, its relations are not subject to variation, although they differ anteriorly in the differ-Thus in the male, it corresponds, inferiorly and anteriorly, to the fundus of the bladder, the prestate gland, and vesicular seminales, while in the female, it is covered by the vagina, with which it is connected by a very considerable voscular lace-work. To this union the name of erclo-raginal replan is given. But anteriorly and superiorly, the rectam is covered by the peritoneum in both sexes, and is in contact with the uterus in the female, and the body of the bladder in the male. Proquently, one or two convolutions of the small intestine glide between it and these organs. Posteriorly, and in both sexes, the rectum lies upon the sacrum and coneyx, from which it is separated by the hypogastric vessels and nerves, contained in a fold of the peritoneum, bread above, where it is continuous with the sigmoid colon, parrow below, and bearing the name of west-rectant. At its lowest part, it is in contact with the levator and muscle. On its sides, this intestine is only connected with the adipose cellular tissue which

occurs abundantly in the polvis, and with the levatorus ani. The unier surface of the rectum is smooth, polished, and white, being covered above by the peritonoum; the lower part, called pouch of the rectum, has no peritoneal covering, but is enveloped by a thick layer of cellular substance, which may be traced to the pelvic fascia. It presents in its whole extent vertical and parallel striat, which are owing to the presence of longitudinal muscular fibres uniformly diffused over its whole circumference, so that it has a considerable resemblance to the osoplagus considered also with reference to its exterior. There are, moreover, observed upon it, the numerous anastomoses of the hemotrhoidal vessels, and some fatty appendages towards the base of the sacrum. The inner surface of the rectum is commonly smooth in its upper half, but, in the lower, that is, in the pouch of the rectum, there are observed some parallel langitudinal wrinkles, which are thicker near the anos, and of variable length, These wrinkles, whose number varies from four to ten or twelve, and which are called the columns of the reclam, are formed by the mucous membrane and the layer of subjectent cellular tissue. Between these columns, there are almost always to be found two membranous semilunar folds, oblique or transverse, of which the floating edge is directed from below upwards towards the cavity of the intestine. These folds are called the shelf-like projections of the rectum; the larger of them lies about 25 to 3 inches from the anus; it forms a well-marked division between the apper or true reclaw and the lower or pouch. These folds form a kind of lacune, the bottom of which is narrow and directed downwards. There are observed, moreover, on the inside of the rectain the urifices of mucous follicles which are directed from above downwards, and reddish villosities belonging to the mucous membrane. The follicles in question pour into the rectum a white and pretty thick mucus. The apper calressity of the rectum communicates with the end of the sigmoid flexure of the colon. The lower, which is very contracted, is terminated by the anna, which is eatuated at about an inch before the coccyx. On the edges of the anus, the inner membrane of the intestine

is continuous with the skin, which, there, is very delicate, furnished with radiating plices, and covered with a greater or less quantity of hale which exists only in the adult male. This extremity is embraced by the sphineter ani, and by the two levalores ani. Next proceed, 1-. With the examination of the pelvic fascia of the right side. 2°. The ligaments and connections of the urinary bladder. 3°. The anatomy of the levalor ani, ischin-coccygens, and sacro-energyens muscles. 4°.

The arteries and wine of the pelvis,

397, EXAMINATION OF THE PELVIC FARCIA OF THE RIGHT SIDE. The peritonoum having been stripped off and the loose cellular substance removed, clean and alterwards divide the remains of the right umbilical artery and vesical arteries, draw the rectum and bladder forcibly towards the left side, and in a great measure out of the pelvis, but leaving them connected; this displays the pelvic fascia which may be now seen descending from the linea ileo-pectinen, and covering the obtuentor interpus muscle and esmeave side of the levator ani ; after descending to a level with the prostate, it is reflected upwards upon the sides, and front of the urinary bladder, becoming thus the vesical fascia, A sort of tendinous arch strengthening the faseis, extends from the back of the symply is to the spine of the ischion. This may be considered as a principal origin of the levator and above and behind, this areh may be seen shining through the fascia, the muscular fibres of the obtustor internes; in front and below it, may in like manner be seen the fibror of the levatur uni; at the back of the cavity of the pelvis, where investing the rectum, the fascia degenerates into bose cellular tissue. At the tendinous arch we have just described, the pelvie fiscia divides into two layers; one, the internal, descends on the inner or concave side of the levater ani; this we have just described ; to see the other or external, look into the ischin metal space, where it will be found to have again subdivided into two layers, the innermost of which invests the convex surface of the levator and, and the outermost processly to the fuberosity and ramps of the iss from to shar in the ultiurater muscle and common putte artery-

208. The LIGAMENTS OF THE BLADDER should

be examined next, and its different regions named. When empty, the bladder (vestea urinaria) sinks down into the privis below the bevel of the symplayars publis; when even moderately distended, it rises up into the hypogastric region. In this condition it is most advantageonaly studied. The folds of partianeum by which that membrane assists in sororing the bladder in its natural position, have very improperly less termed false ligaments; they are five in number, viz. one auperior, two lateral and two posterior. The reflected portion of the peritoneum forming the superior false ligaresent proceeds from the recti muscles to the superior fundus of the bladder; the remains of the uraclus and of the umbilled arteries are on its outer surface. The false lateral liguraterits are merely those folds of peritonoun extending from the sides of the bladder to the iline fosse; it forms unteriorly a doplicature in which will be found the vas deferens in the male and the round ligament of the oterus in the lemale. The posterior false ligaments formed also by folds of peritoneum, extend from the back of the bladder to the sides of the rectum; they give rise to duplicatures or folds containing the obliterated umbilical artery and protor-There are four true ligaments of the bladder, two autorior and two lateral; these are formed by the pelvic fascia, and are formed merely by the connexion of the fascia to the bladder at the point of its reflexion upon that organ from the walks of the pelvis. The unterior of these two ligaments pass backwards from the inferior margin of the pubes near the symplexis, and expand upon the neck of the bladder and prostate gland; the dorsal veins of the penis pass between them on their way to join the iliae veins. Surgical austomists have made the most of the different regions of the bladder. They have been divided into, a superior fundas, an inferior fundus, resting on the rectum; a body and cerviz. Besides these, there are the suprvior region, the Internal regions, the anterior region, the posterior region, lastly, the inferior region, all which present different relations which the student cannot examine too often so long as the bladder is in site. The student may now proceed to examine the anatomy of the levator ani, ischio-coccygeus and spero-coccygeus muscles.

Also the origins of the obturator internus and pyrami-

399. LEVATOR AST muscle. This muscle completes the lower wall of the abdomen, forming, at the lower part of the pelvis, a consave floor, sustaining the inferior part of the rectum and the bladder, around which it forms a cincture, also embracing the commencement of the prethra, and the vesicule seminales. Thus, membrancing, irregularly quadrilateral, broader above than below, arises by short aponeurotic fibres, from the inferior and posterior part of the symphysis pubis, from the ileum, from above the upper region of the obturator internus, from the sciatic spine, and from the pelvic fascia. These different origins, which are continuous with each other, are only a little interrupted, toward the obturator hole, for the passage of the obturator nerve and vessels. The middle and anterior fleshy fibres descend from without inwards and from before backwards; they unite behind and beneath the rectum, with those of the opposite side, and envelope that intestine in a radiating manner; some of the more unterior seem to be attached to the prostate gland, or confounded with the sphincter ani. The posterior descend inwards, and terminate below the sides of the coceyx, forming a tendinous line. The outer reriger of this muscle corresponds to a lamina of the pelvic fascia, to the glutners maximus and transversus perincei, as well as to the fat which surrounds the agus. Its issuer surface corresponds anteriorly to the bladder and prestate gland, and to the inner lamina of the pelvic fascia, and embraces the lower part of the rectum. Its posterior edge is continuous with the coccygens muscle. In the female, this muscle adheres strongly to the vaginu, before arriving at the rectum. It is weaker than in the male, and its fibres, especially the posterior, are less curved. This muscle raises and carries forward the rectum, which it compresses, at the same time that it resists the action of the diaphragm and abdominal muscles. It also favours the ejaculation of the spermatie fluid, and the expulsion of the urine. In the female, it contracts the vagina a little.

400. The Iscour-Coccynaus is of a triangular form, thin, and flat, and concurs, with the preparing, behind

and above which it is placed, to form the floor of the abdominal eavity. Attached to the inside of the sciatio spine, it descends enlarging to be attached to the whole edge of the coccyx, and the lower part of the lateral surface of the sacrum; it is even prolonged a little upon the unterior surface of that bone. This muscle is a mixture of fleshy and aponeurotic fibres, which seem to be confounded in an intimate manner with those of the anterior sacro-scintic ligament. It frequently reecives, from the lower part of the sarrum, a small bundle (the Curvator coccygis or sacro-coccygeus of Scemmering) thin, slender, descending over the middle of the coceyx, and uniting with the two muscles at once. Its posterior surface, which inclines downwards, is covered by the two sacro-sciatic ligaments. The unterior corresponds to the rectum and the cellular tissue which surrounds it. It retains the coccyx, and prevents it from being turned backwards during the excretion of the feces. Its motions are not very decided. Previously to removing the viscera of the pelvis for a systematic examination of their structure, the student, if advanced in his studies, had better examine the arteries and veins of the pelvis.

DISSECTION OF THE ARTESIES AND VEINS OF THE PERVIS.

401. The MIDDLE SACRAL ARTERY (Arteria sacri motio), arises from the posterior part of the abdominal norts, a little above its bifurcation, before the fourth lumbar vertebra. Its size is about the same as that of the lumbar arteries; but it is frequently much less. It descends vertically, and in a flexuous manner, over the sacro-vertebral articulation, and upon the anterior surface of the sacrum, placed, in the median line of the body, behind the rectum, the superior hemorrhoidal vessels, and the nerves of the hypogastric plexus. It is very slender when it arrives at the coccyx, and termimates towards the summit of that bone, anastomosing by two arches with the lateral sacral arteries, and sending small twigs into the fat which surrounds the rectum, and into the ischio-coccygeus muscle. The middle sacral artery furnishes a great number of lateral branches. The first frequently take the place of one of the inferior lumber arteries. They are generally very small and irregular, and communicate with the decolumbar arteries. The others which are larger, come off to the right and left, at the middle of each false vertebra of the sacrum; they direct thouselves transversely outwards, and unite, near the auterior sacral holes, with the branches of the lateral sacral arteries. Sometimes they pass through those holes, and are distributed upon the last spinal nerves. In their course they furnish unmy ramifica-

tions to the periosecum of the sacrum.

402, Company Luxe Auturns result from the hifurcation of the norta, generally opposite the body of the fourth humbar vertebra. Both arteries are of oqual size, descend and separate at an armse angle, directing themselves forwards as far as the mero-iliae symphysis, where they divide each into two large arteries, the Hypogentric and External Hine. The right common iliac artery posses before the end of the iline vein, and covers the yena cava inferinc. The left is no companied internally and posteriorly by the left common iline vein, and is only covered by the peritoneum. The ureters cross, anteriorly and at right angles, the direction of each of them. Externally, they are both applied upon the powe numeles. These arteries give oil no branch, excepting a few slender twigs to the walls of the iline voins, the peritoneum, the lumbur lymplatic glands, and the meters.

403. INTERNAL LLAC. (Hypogentric Artery), is smaller than the external idiac, dives almost vertically into the executation of the privis, before the sacro-diac articulation, and, directing itself forwards, forms a curve, of which the convexity is posterior. At the end of a short course, it separates into numerous branches, which arise separately, or by common trunks, and are distinguished into posterior, auterior, interval and inferior.

A. ILEG-LUNENE ARTERY, (first posterior branch of the hypogentric), arises opposite the base of the sacrum. It ascends autwords and buckwards, before the lumbosacral nerve, and behind the panas muscle, which receives some ramifications from it | towards the anterior edge of the base of the sacrum, it divides into two branches, one ascending, the other transverse. The overeding branch ascends vertically between the panas muscle, as ileans and

last lumbar vertelira, and terminates by anastomosing with a branch of the fourth or fifth lumbar artery; it sends ramifications into the psous, iliacus and quadratus lumhorum muscles, and into the periodeum of the sterum and the iline bones t one of its twigs enters into the vertebral canal, under the fourth or fifth humbar vertebra, and is distributed to the dum mater and nerves, there anastomosing with the artery of the opposite side, the lateral sacral and the last lumbar. The transverse brasch directs itself outwards, between the psous and iliaeus muscles, and subdivides into two orders of twigs. Some of these spread out upon the anterior surface of the iliacus muscle, beneath the peritoneum, and anastomose anteriorly with the circumflex iliae: the other, or deep twigs, penetrate into the muscle, and are distributed in all directions to its fleshy fibres and to the periosteum of the iliac fossa. One of them, of considerable size, enters the iliac bone, by the hole which is observed at the middle of the iliae fossa,

E.SACRO-LATERAL ARVERY, (second posterior branch of the hypogastree). Directed inwards and downwards, it descends before the anterior sacral holes, and reaches the summit of the enceyx, where it anastomoses by an arch with the middle sacral artery. The External or Posterior treigs are large, usually four in number; introduce themselves into the sacral canal by the anterior speral holes, and divide each into two secondary. brigs; one passes over the anterior wall of the sacral canal; the other issues by the posterior meral hole, and loses itself in the muscles of the vertebral grooves; those of one side generally communicate with those of the opposite side. The Internal twigs spread their ramifications in the sacral nerves and glands in the pyriformis muscles, and upon the periosteum of the sacrum, anastomosing with the lateral branches of the middle sacral artery.

c. GRUTEAR AUTERY, (third posterior branch of the hypogentric), and usually its largest branch. Directed downwards, outwards and backwards, it issues from the pelvis by the apper part of the sciatic notch, above the pyelformic muscle, between the lumbo-sacral and the auterior branch of the first socral nerve. It gains the posterior part of the pelvis, is covered by the glatieus maximus, and near the posterior edge of the glutiens minimus, divides into two branches, the one emperfirsal, the other deep. Before issuing from the pelvis, this artery sends some small twigs to the rectum, pyriformis muscles and neighbouring cellular tissue. superficial branch directs itself outwards, between the glutneus maximus and glutnes medius muscles, and separates into many twigs, anastomosing with the sciatio artery. The deep branch ascends from behind forwards, between the glutieus medius and gluneus minimus, gives first a nutritious twig to the or innominatum, and subdivides into three secondary branches. Of these, the opper chiefly supplies the glutaus medius and minimus; the middle or transverse branch gues mostly to the glutieus medius; the lower branch gives branches to the pyriformis and glutsess minimus, capsule of the hip-joint and rectus femoris, anastomosing with twips of the femoral artery.

p. Userman Arreny, (first unterior bruses of the hypogastric). Directed forwards and inwards as for as the lateral and upper part of the bladder, it bends upwards to ascend behind the anterior wall of the abdomen, where it is contained in a fold of the peritoneum, and whence it directs itself inwards the umbilicus, approaching the uraches and that of the opposite side. In the adult, this arrery is all but obliterated. But in the fectus, it is of large size, and appears to form the true continuation of the trunk of the hypogastric arrery. On arriving at the umbilicus it issues by that aperture, forms part of the umbilicul cord, and gains the placenta; it then furnishes all the other branches of the hypogastric, while after birth it gives only a few very slender

twigs to the bladder and uterus.

E. Vasteau Abverges, (second anterior branch of the hypogastric), varying as to number and origin. The umbiliest artery always furnishes three or four, which ramify in the walls of the bladder, and anastomose there with each other, and with the neighbouring branches. The middle hiemorrhoidal, internal pudie, and obturator arteries furnish others. The hypogastric produces one a little larger, which gains the fundus of the bladder, and sends it numerous twigs, as well as to the commencement of the methra, and in the male, to the presists

gland, resigning seminates and vas deferens. Its last rumifications reach as far as the rectum.

F. ORTURATOR ARTERY, (third unlerior branch of the hypogustric), sometimes a branch of the glutgal, and also of the epigastric; in the latter case, it descends vertiearly behind the time home as far as the obtarator hole. When normal, i.e. a branch of the hypogastric, it directs itself forwards and outwards, then turns horizontally into the excavation of the pelvis, over the obturator internus muscle, under the obtarator nerve, along with which it issues from the pelvis through the empty space left by the obturntor membrane. In this course it is alightly flexuous. Near its origin, it gives off a large twig which is distributed to the iliacus muscle. Also a number of small twigs to the obterator internus, to the neighbouring lymphatic glands, and to the bladder. Before entering into the obtarator hole, it gives off a branch which directs itself behind the symphysis pubis, sends ramifications upon the periosteum, and anastomoses with a similar branch of the opposite obtarator artery. At its exit from the pelvia, on the upper edge of the obturator externus muscle, the artery divides into two branches, a posterior and an anterior. The Posterior branch descends along the outer edge of the obturator hole, placed between the two obturator muscles, in which it sometimes directly loses itself. In general, however, it reaches as far as the sciatic tuberosity, bends outwards beneath the quadratus femoris musele, and gains transversely the back part of the thigh, where it gives several twigs to the deo-femoral articulation, and anastomoses with the descending branch of the sciatic artery. It loses itself in the surrounding muscles; but there is detached from it a very remarkable small twig, which penetrates into the catyloid eavity by its inferior notch, and goes to be distributed to the reddish colinlar tissue which fills the deepest part of that cavity. The Anterior branch descends between the long and short addactor muscles, giving off twigs to them, as well as to the neighbouring muscles, and to the integaments of the upper and inner region of the thigh and of the genital parts. It ferminates by anistomosing with a twig of the internal circumitex artery. Near its commencement, it sends

off a small twig which descends along the internal edge of the obturator hole, to anastomose with a twig of the posterior branch, so that this foramen is surrounded by

a complete avterial zircle.

o. Middle Hamourdonna Arrany (first internal branch of the hypogostric), of more constant occurrence in the female than in the male, varying in size and origin, and frequently coming off from the inchiatie or internal public. It descends obliquely over the anterior part of the rectum, behind the foodus of the bladder in the male, and behind the vaging in the female, separating into a number of twigs, which expand in different parts, and anastomose superiorly with the hamorrhoidal twigs of the inferior mesenteric artery, and

inferiorly with those of the internal pudie.

it. Uteritie Artery, (second inherest branch of the hypogastric), small in the unimpregnated state, but at the end of gestation larger than any other branch of the hypogastric artery. It directs itself at first upon the lateral and upper part of the vagina, between it and the bladder, giving off a number of twigs to both these organs. It then ascends, in the substance of the ligumentum latum, upon the sides of the uterus, and has an extremely flexuous course; divides into numerous twigs, which penetrate into the tissue of the organ, proceed transversely and in a flexuous manner over its two surfaces, and anastomose in the median line with those of the opposite side. It also sends to the Fallopian tube and round ligament some small twigs which inco-

1. VAGINAL ARTERY, (third internal branch of the hypogastric), exists only in the female; when absent it is replaced by twigs of the uterine, vesical and middle beenorrhoidal arteries, which are distributed in the walls of the yagna. It descends forwards, furnishing a twig to the lateral region of the bladder, then continues its course over the side of the vagina, gives it numerous branches, and reaches as far as its orifice, whence it distributes ramifications to the external parts of generation.

k, Lichtaric America, (first inferior branch of the hypogendric), appears to be the true continuation of the trunk of the hypogestric. Directed downwards between the rectum and the walls of the pelvis, before the pyri-

formis muscle, it somes through the lower part of the sciatic notels, between the inferior edge of the pyriformis and the anterior sacro-sciatic ligament, having behind it the great sciatic nerve. In the pelvis, this artery furnishes tuigs to the rectum, bladder, uterus, and levutor ani muscle, and at times gives off the two pudie, the middle hemorrhoidal, and the obtarator arteries. At its feaving the pelvis, the ischintic artery separates into several large branches; one directs itself obliquely dawnwards and inwards, full-wing the origin of the glutaus maximus which covers it, gives off twigs to it, and loses itself in the ischip-coccygens and levator ani muscles; another branch is distributed in the lower third of the glutious maximus and in the cellular tissue which surrounds the sciatic tuberesity; a third accompanies the sciatic nerve as far as the inferior and posterior part of the thigh, and gives twigs to the neighbouring muscles It anastomoses with the perforating and circumiles arteries.

L. COMMON OF INTERNAL PUBLIC ARTERY, (second) inferior branch of the hypogastric), smaller than the ischiatic of which it is often a branch. It descends before the sciatic pleaus and pyriformis muscle, and issues from the pelvis by the lower part of the great sciatic noteh, between the pyriformis musile and the posterior edge of the levator ani, close to the anterior sacro-sciatic ligament, and separated from the ischintic artery by a layer of fat. Immediately after, it proceeds downwards and inwards, passes between the two sterosciatic ligaments, bends over the anterior, which it embraces externally, places itself upon the internal surface of the ischium, between the obturator internus and levator and muscles, runs horizontally fotwards and inwards to near the common origin of the erector penis and transversus periner museles, and there divides into two branches, which are differently distributed in the male and in the female, and of which one is superficial and the other deep. In the pelvis, this actery occasionally gives off the middle kaemorrhoidal, obturator, &c. But it always sends branches to the bladder, vesionlie seminales, prestate gland, urethra, rectum, and (in the lemale) upper part of the vagina. After issuing from the pulvis, it gives off laterally numerous twigs,

which may be distinguished into internal and external, The internal are spread out in the midst of fat which surrounds the rectum, and are distributed to the sphineter and levator ani muscles. The others descend towards the tuber ischii, towards the origins of the flexor muscles of the leg and in the integuments. The superficial perincal branch runs from behind forwards, between the skin and transversalis perinci musule, in the adipose cellular tissue which fills the triangular space between the erector penis and accelerator uring muscles. At first nearer the ramus of the ischium than the raphe, it approaches the latter as it advances, and gives numerous twigs, (one of which is the arteria transcersalis perious), to the anterior half of the sphineter and musele, and to the transversalis permai, erector penis and accelerator urious muscles, as well as to the integuments. Some of them ascend towards the rectum under the name of inferior or external tamorrhoidal arteries, and anastomuse with the middle homorrholdal and the termination of the inferior mesenteric. the branch itself passes over the accelerator urinamuscle, dives into the septem of the dartes, and is distributed to the seratum, dartes, and skin of the penis. The deep branch traverses the transversus perinasi musele, and then ascends above it, along the ascending ramus of the ischlum. Concealed by the erector penis muscle, it arrives at the triangular cellular interval which separates the two roots of the corpus cavernosum, before the symplicis pubis, where it divides into two branches which are called the dward artery of the penis, and the artery of the corpus caveranswer: before this however it gives off the brunch of the balb, (rawns magnus od wrethræ bulbum) directing itself inwards and forwards, above the transversus peringel muscle, so far as the bulb of the urethra, into which it dives, subdividing into several twigs. One of them penetrates into the corpus cavernosum, and there annstomoses with the cavernous artery. After giving off the artery of the bulb, the deep branch of the pudie sends small twigs into the obturator internus, erector peaks, and transversus perings nauscles, and into Coupoe's glands. The branch to the corpus cavermount, fart, corpora coperno i prair.) penetrates into the cor-

responding side of the corpus envernosum, and presently divides into several secondary twigs, which run along its whole length, and distribute in all directions a great number of ramifications in the midst of the spongy tissue. Some of them perfurate the fibrons membrane, and introduce themselves into the walls of the urethm. The branch to the dorson of the peaks, (art. dursalis penis,) passes through the sub-pubic triangular membrane, (note to sec. 151,) runs along the dorsum of the penis. Its course is flexuous, and it gives numerous small twigs to the fibrous membrane of the corpus cavernosam and to the skin. Near the glans, it subdivides and loses itself in the tissue of that part, the right and left arteries frequently anastomosing. In thefemale, the superficial branch of the internal pudic artery, after sending twigs to the transversos permei, sphineter ani and constrictor vaging muscles, terminates in the substance of the labium. The deep branch, (art. clitoridir,) ascends along the ischiom and pubes, so far as the interval between the roots of the corpus covernosum of the cliteris, throws a twig into the retiform plexus which surrounds the orifice of the vagina, and separates, before the symphysis of the pubes, into two secondary branches, one of which penetrates into the corpus cavernosum of the chitoris, (Art, coerrumn chtoridis, I while the other creeps upon the back of that organ, (Art. docadis elitoridis,)

404. External Illac Artery arises from the bifurcation of the common disc artery, and extends to the
crural arch, where it changes its name to that of femoral artery. It descends obliquely untwards, along the
inner and fore part of the puras muscle, applied posteriorly and internally upon the external iliac vein,
and covered by the peritonesia. It is generally straight,
but sometimes forms several curves of greater or less
extent. In its course, it gives off a few small twigs to
the pseus muscle, the peritonesian and the neighbouring lymphatic glands. Before passing the crural arch,
it furnishes two considerable branches viz., the opens-

tric and circumfler time neterica,

A. Eptoastrue Anvent, first branch; arises from the lower and internal part of the external iliac artery, a little above the crural arch, and beneath the place

where the peritonoum leaves the anterior wall of the abdomen to be reflected into the iliae fossa. It immediately directs itself inwards and forwards, crosses the direction of the spermatic cond, which concents its arigin, and ascends vertically to the inner side of it, and of the internal inguinal ring, between the peritoneum and fascia transcersalis. It still follows a little the opportulge of the rector muscle, and at the distance of about two inches above the pulies, passes upon its posterior surface, along which it proceeds as far as the unabilious, where it terminates by several twigs. This epigastric first gives than to the peritoneum, the neighbouring cellular tissue, and the spermatic cord-One twig enters the inguinal ring, and is distributed to the cromaster muscle, the tunier vaginalis, and the skin of the serotum, anastomosing with the spermatic artery, and in the female, to the ligamentum teres, mons veneris, and apper parts of the valva. Heyond the spermatic cord, the epigastric artery gives off numerous lateral branches to the sectus muscle, and outwards to the broad muscles of the abdomen; furnishing twigs to the peritoneum, and amortomosing with the lumbar and last intercostal arteries. The terminating twice communicate with those of the internal mammary

B. CIRCUMPEX LUAC ARTHUY, second brunch of the external illac, is immersed at its origin in cellular tissue, and consealed by the perituneum; it ascends ubliquely outwards, curving a little along the outer edge of the ilianus interner muscle, until above the anterior superior iliac spine; it then separates into two branches, after giving off external twigs to the transverse abdominal musele, and internal twigs to the Binens musels, anastomosing with the ileo-lumbar artery. Of the two branches which terminate this artery, the exterwal is small, and ascends between the transversus and obliguus internus abdominis muscles, in which it loses itself. The internol, is larger and transverse, runsalong the iline crest, and ascends obliquely backwards, between the transversus and obliques internes abdominis musides, in which it divides, us well as in the obliquas externas anastumosing with the internal mommary artery, the lumbar and inferior intercostal arteries.

The student may now proceed to remove the whole of the polyic viscera including the supra renal capsules, kidneys, and arrives, in order to examine these reparately, and make himself poster of their systematic

anatomy.

405. The Supra-unna Capatitus are two small hodies placed above the kidneys, of which they embrace the upper extremity. They are nover wanting, but their uses are totally unknown. Hollow and real in the adult, they are prismans and granulated in the feetus, in which their volume, proportionally of course, is much greater than in the adult, on which around it has been supposed that they must have some connexiou. with the exercise of nutrition in the first stages of life. These capsules are of a yellowish-brown colour, prosent a posterior surface corresponding to the displangm and upper part of the pseus-; an neterior surface covered on the right side by the verm eavn inferior, the duodenum, and the liver, and on the left side by the spleen and panerene; and an inferior susfine, numare, and applied upon the summit of the corresponding kidney. Each supra-renal capsule is really a small large with thick parenghyumtous walls, farmed of small granulations, collected into lobules, and having but little consistence. In its interior there exists a triangular eavity, without any known orifice, farnished in its inferiur part with an eminence in the form of a a ridge, and containing in the fierus a considerable quantity of a reddish, viscous fluid, coxquiable by alcohol. In children, this fluid is yellowish, in old people brown, These expsules receive a great munder of arteries from the aorta, the inferior phrenic and const arteries, which are larger in the child than in the adult. The veins of those of the right side pour their blood into the vena cava; those of the left side open into the renal vein. Their lymphatics enter into the formation of the countgent and inferior disphragmatic plexuses. Their nerves come from the renal plexuses.

406. The Kroskys (Rever), the menoting organical the urino, are two glands situated in the borabar regions, on the sides of the vertebral extonut, opposite the last two dorsal and the first two bundars vericless, one to the right, the other to the latt. They are enveloped

on all sides by a solid, thick mass of fat, the left is higher than the right. Their colour is a dark red, inclining to brown. Their form is that of a kidney-bean. Their volume is proportionally larger in children than in adults, in women than in men. The autorior surfour of the kidneys is convex and anmetimes completely covered by the peritoneum. At other times it is more or less in connexion, to the right side, with the vertical portion of the duodenum, the liver and the assemiing colon, and to the left, with the spleen and the descending colon. Their posterior surface almost flat. applied upon a thick layer of fat which separates it from the diaphragm and the aponeurosis of the transversus abdominis muscle. Their circumference presents: 19, superiorly, a thick and rounded extremity, embraced by the corresponding renal capsule : 20, inferiorly, a thin and somewhat elongated extremity, which approaches more or less the iliae spine : 3", externally, thick convex edge, inclined backwards: 4". internally, a deep notely (fissure of the kidneys) more distinct anteriorly than posteriorly. Each kidney receives from the north an artery of considerable diameter, and sends to the vens cava inferior corresponding veins. A nervous plexus and lymplaties accompany these vessels. The parenelcyma of the kidney is firmer than that of the other glands; composed of two distinct substances, an external (cortical), an internal, (tabular or mamillary.) The exterand or cortical substance forms around the kidney an external layer, one or two lines thick, of a dark or reddish buy colour, and adhering to their eagsular membrane. Internally, it furnishes several prolongations in the form of septa, between which are placed the conical bundles of the tubular substance, and which sliminish in thickness towards the pelvis, from which they are separated by fat. This substance tears with great ease, and appears under the microscope romposed of solid granulations, formed by the capillary extremities of the renal arteries and veins. The internal or Inbular mistance represents a number of conicul, trunrated bundles, reveloped on all sides, excepting towards their summits, by the cortical substance. The less of these cones is rounded and directed towards the circumference of the kidney; their summit is directed towards the polvis or fissure of the kidney. The colour of this substance is pale red, especially at the centre of each cone. Its tissue is dense, firm, and tenacious. It is formed of numerous delicate convergent canals, very close upon each other towards the summit of the cones, and directly continuous with the vessels of the cortical substance, from which they derive their origin. They are expanded at the surface of each cone, while towards its summit they open at the interior of the calvoes by orifices extremely close upon each other. The summits of the cones represent so many mamualibe at the surface of which the urine thus oozes out. Some anatomists consider the mammillae a third substance, (waswillary substance.) Their number, which is generally equal to that of the cones, varies from twelve to eighteen; but, in some subjects, two cones are seen ending in a single mammilla, or two mammilla terminating in a single cone. They are separated from each other by adipose cellular tissue. They are often short and blunt, but they are also seen to prolong themselves into a more or less distinct prominence of a cylindrical or pointed form. The orifices of the canals of the tubular substance which are perceived at their surface, are less numerous than the canals themselves, on which account it is to be presumed that several of the latter unite before terminating. The membranoscaence hope of the kidnew is double, and covers their whole surface, dips into their fissure, where it is traversed by the divisions of the renal vessels, and reflected upon the free surface of the pelvis. It may be easily detached from the cortical substance, with which it is connected by numerous delicate filaments, and by some small blood-vessels. Though double, it is thin, transparent, and possessed of little extensibility, and appears to be of a cellulo-fibrous na-The urine secreted in the cortical substance of the kidneys passes through the ducts of the tubular substance, and thus arrives in the pulyers, the peleis, and wreter. I'. The culwes (infindibula) are small membranous duets, embracing, on the one hand, the circumference of the mammilla, and on the other, opening in the pelvis, and only at its extremities or towards the side of it which faces the convexity of the kid-

may. Their number varies from six to twelve, one of them frequently belonging to several manusillar; their diameter is always prepartional to the number of mammille which they embrace. 29. The peleis is a small membranous bag which occupies the posterior pure of the fiscure of the killing, placed behind the renal artery and vein; clongated from above downwants, flattened from before backwards, presenting an irregularly oval form, contracted below. The orifices of the calvees are perceived in its deepest part. The wreter is a long membranens canal, of a cylindrical form and of about the size of a writing quill, extended obliquely herween the privis, with which it is continuous, and the bottom of the bladder, into which it opens, It commences in the sinunsity of the kidney by a hellowed portion, which is named the infundibulum. From thence it descends obliquely inwards as far as the sacro-line articulations. Continuing to descend, it directs itself forwards, to the inferior posterior wall of the bladder, between the museular and mucous membranes of which it passes, contracting a little. It proceeds thus between them for the space of about an inch, directing itself inwards and forwards, and terminates by a parrow oblique crifice, situated in the male about half an inch behind the prestate gland. The ureter corresponds from above downwards, and postsriorly, to the psons magnus muscle, the common than vessels, whose direction it crosses, and the hypegastric vessels. .faterior/o, it is at first envered by the peritoneum and the spermatic artery; in the exercation of the polyis, it is crossed in the male by the vas deferens, The preter of the right eide is placed externally of the vena cava inferior, to which it is parallel. The galyees, polyis, and oreter appear to have the same organization; their walls are composed of two membranes. The outer thick, of an opaque white colour, ravered externally of the pelvis and ureter by a prolongation of the filirons capsule of the kidney. The more muchus. thin, white, and semi-transparent, is prolonged from the calvers over the mammille, and, perhaps, even introducer itself into the uriniferent tabes.

407. STRUCTERS OF THE URINARY BEADURE. We have already described its form, situation, and connex-

ions (398); it is only nonessary here to speak of its struc-Its tunies are, 1st, A perimonal or serous coat : this, as less been shown, is only a partial funic; a loose cellular membrane unites it to the trainal fazzia; this forms the second tunio of the bladder, and is derived wholly from the pelvie fasca, as has been already explained. The 3d tente is muscular. It is intermediate in colour and thickness to those of the stomach and ecophagus. It is extremely thin, except uswards the fundus, between the vesicular seminales, and at the enperior region, and is composed of small whitish laselculi, flattened, following longitudinal transverse directions. Those which are situated in the modern line ascend from the prostate gland and the neek of the bladder towards the urachus. The rest arise from the lateral parts of the neck, and cross each other at the superior region. Sometimes they unite mor cylindrical columns, which eross each other, and are more or less prominent. The neek of the bladder is not surrounded by a particular muscle, as some anatomism aver. The fleshy fibres are here only brought closer together, and applied upon a layer of whitish, firm, elastic, extensile tissue, having a fibrous appearance, which is prolonged, becoming thinner, as far as the base of the trigonal space, and which contributes to form the prominence of the uvula vesiene. 4". Some anatomists consider the cellular membrane situated beneath the muscular tunic as a distinct tunic. It connects the muscular and muenus layers of the bladder together. 5% The mucous tunic. To display this membrane, lay open the bladder anteriorly from the superior fundus to the neck, including this, however, in the meision, and the prostate which surrounds the cervix resigns and communecement of the urethra; the incision may be prolonged throughout the whole length of the urethra to the ordicions unothern externalit; this exposes the structure of the urethra and pents. The morous membrane of the bladder is thin, continuous with that which lines the protors and urethra; it is frequently marbled with a slight red tint; its villosities are delicate, and not reudily seen. In the untural state, no crypts or inucous follicles have been set perceived in it; in certain pathological cassa, however, their presence is very apparent. The arteries of the bladder arise from the hypogustric-

umbilical, inchintie, middle bemorrhoidal, and internal pullic arteries. Its voins, which are numerous, join the hypogastric venous plexus. Its nerves come from the sciatic and hypogastric plexuses. Its lymphatic vessels ramify in the hypogostric glands. Thus the internal surfaces of the bladder is formed by a mucous membrane furnished with a great number of villosities, much less apparent than those of the intestines. presents, in its empty state, numerous irregular rugge which disappear when the bladder is full. In certain subjects only, there are observed clongated persistent prominences, prossing each other in different directions, and separated by cellules varying in breadth and depth. This disposition is owing to a greater development of the museular fasiculi of the bladder; and when it exists, the bladder which presents it, is commonly called a Colsionar Bladder (Vessie ii eclonnes). name of Trigonal Space of the Bladder (La trigone de la ressie. Lieutand,) is given to a smooth triangular surface on the inside of the bladder, in the middle of its fundus, and where the mucous membrane is destitute of The two posterior angles of this triangle correspond to the month of the wreters, and the anterior to the origin of the arethra. Its sides are each about an inch long, and the muscular fibres are here frequently stronger,* Its base is directed backwards, and its sammit forwards. The orifice of the urethra, which is also named the Neck of the bladder, has the form of a arescent, the circumference of which is thick. A small inherele (Usula resica), said to be formed by the prosection of the mucous membrane, was described by Lieutzud. It has no existence in the healthy bladder,

408. MALE GENERATIVE ORGANS These must be examined to a systematic order, and we shall first describe

A. The Sesorosa. The skin and its surface has been already described (secs. 347, 348); upon reflecting this, the Durito are exposed; these are two cellulo-filamentons membranes traversed by vessels of all kinds, destitute of fat, of a redush tint, attached to the rami of the ossa pubis and tachit, whereas they descend towards the

^{*} Then museum hands were described by Morgagni and Sir C. Bell as illating amelia.

raphe, to which they closely adhere. Above it they are reflected from beneath upwards, come into mutual contact, forming a septum (Septum Scroti), and terminate at the lower part of the unothen, thus separating the two testicles from each other. Their outer surface. adheres to the cutmenus envelope of the scrotum in the greater part of its extent. The inner corresponds to the fibrous coat, and adheres to it by some prolongations. It also covers the extremities of the cremaster muscle. The darms appear in general entirely cellular, exhibiting, however, occasionally an appearance of muscular filtres. These membranes are strengthened by a thin and flat fibrous band, which proceeds from the upper and outer part of each inguinal ring. MM. Chaussier, F. Lubstein, and Breschet, thought the dartos absent previous to the descent of the testicles. . Some authors consider the dartos as distinct from the superfinial fascia of the abdomen, and not continuous with it; there are no good grounds for maintaining this opinion. The cremaster muscle has been already described, (355). Divide the serotum entirely, and examine

n. The Testes. Their anatomy has been lately examined with great care by Sir A. Cooper, The result of his dissections, combined with what was known previously, is as follows :- The weight of a healthy resticle and epididymis is about an ounce. The serous fanic is a partial one; below it is the funion albugioen leslis, which, besides being complete, sends a process into the interior of the organ, the confinitions lestis. From this inverted portion arise numerous ligamentous cords; of these, some form purses, enclosing the lobes of the glandular structure, others proceed to the inner surface of the tunica albugines. Sir A. Cooper thinks that the tunica albuginea may further be subdivided into two layers; he proposes calling the innormost one lunica vasculosa testis. The tubuli seminiferi are disposed in numerous pyriform lobes, which are of two kinds, a larger and smaller. Each tubular begins from one of the canals which form the refe, and when unvavelled, is found to be composed of a long convoluted vessel; these tabuli compose the great massof the testis. By the refe is meant a set of canals which receive the semon from the taboli; these canals are situated within the numbigations at the posterior edge of the testis, apposite to the epididymis. The cose offerentia pass from the rete testis to the epididymis in which they terminate; they vary in number, but are usually 13 or 15; they arise singly from the rete, and terminate in the epididymis in such a way so in to leave the epididymis a single take. The head and tail of this tobe have been called the globus major and minor; the vasa efferentia assist to forming the globus major, and the globus minure, or tail of the epididymis, terminates in the two deferens. The body of the epdidymis is entirely compared of the convolutions of a single seminal rathe. The was deferens proceeding, upwards, constitutes a portion of the spermatic cond-

c. The Spermatic Cond (Funcatur Spermaticus), composal of the spermatic artery and vein, of some other inconsiderable and ovegular blood-vessels of lymphatics, of nervous fibusents from the spermatic plexia, and from the genito-crard branch of the bumbaabdominal plexus, and of a duct for the semen called the vas deferens, enveloped by accord membraneous layers, and a quantity of cellular tissue. From the upper edge of the testicle, which is suspended at its extremity, as for as the symphisis publis, the opermatic cord, commonly shorter on the right side than on the left, and of variable size, ascends almost vertically. There, it receives numerous veins from the scrumm, and then directing itself outwards and upwards, enters the abdomen by the inguinal ring, crossing the epigastric arrery; the organs of which it is compused, here separate from each other. The membraneous layers which surround the spermatic cord are the fibrous cont. of the Aunies communic and the cremester muscle.

n. Vas Durenuss (Ductos Defereur), arises from the tail of the epididymis, ascends, describing several flexuosities, behind the testicle, and enters the spermatic cord, behind and internally of the spermatic artery and voin, and the nerves oblich accompany them. After clearing the inguinal ring, it leaves the other vessels of the cord, descends buckwards and inwards, parallel to that of the opposite side, upon the sides of the bladder, passes behind the umbilical arrary, and before the lower part of the aroter. Arriving under the infotion and posterior region of the bladder, it approaches its follow, is that upon in a remarkable manner, becomes

more adherent, and changes its direction so as to proesed horizontally from behind forwards, and from without inwards, along the inner side of the vesicular seminales. At the base of the prostate gland, it receives a canal from the vesiculæ seminales, and is continued into the ejaculatory duct. The vas delevens, from heing rather slender near its origin, and so long as it is contained in the spermatic conl, increases in size in passing through the inguinal ring, and becomes twice as large along the vesseolse seminates. At its termination, it resumes its original size. With respect to its dimensions, no duct has so small an internal diameter : its cavity is scarcely expable of admitting a hair from the epididymis to within the abdomen; but near the vesicule seminales it sensibly increases. Its walls are thick; of a dull white colour, have an almost eartilaginous consistence, and are probably lined by a mucous membrane.

r. The Vestculæ Seminages are two soull membraneons hags which form a reservoir for the somen; placed under the bladder, before the insertion of the unders, above the rectum, behind the prestate gland, externally of the vasa deferentia, and internally of the levatores and muscles; they are of an irregular conical form, flattened from above downwards, tobercular and bulgedin their whole surface, immersed in a mass of adipose cellular tissue, traversed by a great number of arteries and veins, have no communication with each' other, and are directed ubliquely from without inwards, and a little from above downwards. Widely separated behind, and only disjoined by the vasa deferentia before, they circumscribe between them a triangular space, in which the bladder is in contact with the rectum. Their posterior extremity or funday is a rounded cal-de-sae of considerable breadth; their anterior extermity or neck is clongated, narrow, and sometimes concealed by the base of the prostate. It terminates by a very short canal which opens into the vas deferens. The vesicular siminales have generally in the udult a length of two impres and a half, a freenith of six or seven lines towards their fundes, and a thickness of two or three lines. The interior of the vescular seminales scenns, at first eight, to form a envity composed of numerous cellules, asparated by partitions ; but it in reali-

ty represents a flexuous canal, terminating above in a cul-de-sac, and into which there open laterally simple or compound appendages, to the number of six, eight, ten, fifteen, or even twenty. These appendages give rise to the prominences observed at the external surface. They are very close to each other, and connected together by a dense reliular tissue. They may be separated by careful dissection, especially if the parts have been previously macerated. The vesicular seminales are commonly filled with a thick, yellowish, opaque fluid, of a peculiar smell, and of an aspect very different from that of the comen which is ejaculated during life. The walls of the vesicular seminales are evidently formed of two membranes. The external, which is dense and whitish, appears to resemble the substance forming the yas deferens, only it is thinner. The internal, which belongs to the nester of mucous membranes, is fine, almost white, a little wrinkled, and

similar to that which lines the gall-bladder.

P. The PROSTAGE GLAND, (Products), formed by an assemblage of mucous follicles, and surrounds the commencement of the methra in the male. It has the form of a truncated cone, flattened from above downwards, and superficially notched at its base, which is directed backwards. Its axis is nearly horizontal, but inclined a little forwards and downwards. It is much thicker behind, and on the sides than before. Its upper surface is immediately envered by the anterior ligament of the bladder. The lower surface, smooth and plain, rests upon the rectum, to which it adheres by a dense cellular tissue. Each of its surfaces is traversed longitudinally by a superticial groove. Its sides are rounded and correspond to the levatores an imuscles. Its base embraces the neck of the bladder, and forms around it a prominence, especially on the sides. Its aummir terminates upon the membraneous portion of the arethra by gradually becoming thinner. The prostate gland is traversed longitudinally, and neaver its upper than its under surface, by a canal, wider in the middle than its extremities, which lodges the commencement of the arealers, or surrounds at least the three upper fourths of the circumference of that canal. In its lower part, it is also iniversed by the two ejaculatory ducts, which are ledged in a conical canal of which the summit is directed forwards. The prostate gland is of a grayish white colour. Its tissue, which is very dense and firm, is of a nature very difficult to be well described. It is filled internally with a great number of small follieles containing a viscid, ropy fluid of a whitish colour. From these follieles arise excretory duets which collect to the number of ten or fifteen, and open in the urethera, on the sides and at the surface of the acronomianus. By compressing the prostate gland, the fluid which it contains may be made to distil from the orifices of these duets. Surgical anatomists divide the prostate into three portions, viz. two lateral lobes, and a third or middle lobe. This latter is a process seen at the back, connecting the lateral lobes to each other.

6. Cowers's Glands (Accessory Glands) are two small, granulated, oblong or rounded, glandular budies, placed parallel to each other before the prestate, on the sides of the urethra, and above the acceleratores urine muscles. They are about the size of a pea, of a reddish colour, and of a tissue which is pretty firm and resembling that of the salivary glands. These glands, which are sometimes wanting, have each an exerctory dust about six lines in length, which creeps obliquely inwards and forwards in the spungy tissue of the urethra, and opens before the recussorlaxum. A small gland of the same before has sometimes been met with in the angle formed by the union of the routs of the corpus cavernosum.

a. Exaculationy Ducts, (Ductus Ejaculatorii), are formed by the junction at an acute angle of the vasa deferentia with those which terminate the vericulae seminales. They are of a conical form, and about an inch in length. They proceed forwards, parallel to each other, in the substance of the prostate gland, units with each other, contracting considerably, and open into the arethra by two small oblong orifices, situated upon the lateral and anterior parts of the verumontanum. Before their termination, they bend a little outwards. Their course and structure is readily shown by passing bristles into them and then laying them open.

409. The Penis is formed by 1°, the corpus covernation, the principal scat of erection; 2°, the wrethro, destined for the transmission of the semen and urine; 3°. the corpus spangimum weekers, terminated by the glone; by seasels, nor co. and a entoneous envelope which given rise to the propose. The propose, (a process of the common integraments of the points,) does not require

any particular description.

A. The Courses Cavennosum forms about twothirds of the values of the prois. It extends from the anterior and internal part of the secatic tuberesities as far as the substance of the glass. Many authors describe two corpora cavernosa in the penis, but there only exists one. There are distinguished in it two roots or crura, an anterior extremity, and two surfaces. The Crura of the Corpus Covernment are attached to the inner edge of the rami of the own ischil and pubis, and covered internally by the erectores penis muscles, About two inches in length they commence at the fore part of the solatic tuberosities by a slender extremity, and unite before the lower part of the symphysis pubis. The triangular space which separates them from each other is filled by fat and by the mothers. The asterior extremity represents a truncated cone, united to the base of the glans, and perforated by several apertures for the passage of vessels. Its upper surface is marked with a longitudinal and shallow groove, in which run the dursal arteries and reins of the penis. At its backmost part, it gives attachment to the Suspensore Ligarent of the Penix. Its inferior surface presents a broad gruove, deeper than that of the upper surface, which receives the apper part of the corpus spongiosum wrethre, to which it is attached by a filmmentous pellular tissue. The corpus cavernosum is co-cottally composed of an elastic, filtrom, strong external membrane, and of an internal apongy tissue. The Fibrana Membrone is clastie, thick and strong, excepting upon its roots, in the groove which receives the urethra, and at the extremity which sustains the glans, in all which places it is traversed by a multitude of vescolar ramifications. Its general colour is opaque white, excepting in the parts just mentioned, where it appears more or less livid. Its fibres are interlaced proteriorly with the periosteum of the ischium and pulses, and the aponeurous of the muscles which are attached to their lower edge. The cavity of this fibrous membrane is divided into two lateral portions by an incomplete module partition. (Sep-

lum pertiniforme), which communes before the symphysis pubis, but is not prolonged as far as the glans, presenting in its anterior third only a few flattened fascircle, separated by intervals of greater or less broadth. The Springs Traine fills the whole cavity of the fibrous membrane, is a complicated face-work of arterial and vonous vessels, probably of nervous filaments, and of small filtrane lamina, which by crossing each other, form a multitude of cedules, which all communicate together. An injection made by the cavernous artery penetrates into these cellules, but this is no proof of any direct communication with these cells during life. The filaments which enter into the composition of this tissue are distinctly continuous with the fibrous membrane. The arteries of the corpus cavernessum come from the deep branch of the internal puble, and occupy the centre of its lateral portions; they have frequent mastomeses with each other, and communicate with the arteries of the glans and urethra. Lately, M. Mulfor has described a peculiar plexiform arrangement of certain of the arteries of the corpus cavernmum; to these vessels be has given the names of arterio kelicina, and ascribes to them the phenomenon of the erection of the penis. We feel assured that no such vessels exist in the corpus spangiosum wrethre. Its veins follow the some course as the arteries; but their volume is much larger.

is. The Unesting is the exerctory duct of both the urine and semen. It is from nine to twelve inches long, extends from the neck of the bladder to the extremity of the penis, where its external orifice occurs, is bent several times in the direction of its length, and has a large capacity; its walls are partly spongy, partly membranous, and it receives in its course the staculatory duets and those of the prostate gland, of Cowper's glands, and of a multitude of mucous follicles. The external diameter is not the same in its whole length. At first directed obliquely forwards and donowards, the urethra travenes the postate gland. On emerging from that body, it passes before the inferice extremity of the rectum, under the sympleysis pubis, ascends before the latter part, between the two erura of the corpus cavernosum, places itself in the

groove of the lower surface of the latter organ, and terminates at the summit of the glaus by a vertically clongated aperture. From the difference of disposition and structure which this canal presents in the different parts of its extent, it is divided into three portions, as follows :- viz. 1º. A prostatic portion, near the bladder, situated above the inferior extremity of the rectum, at about an inch from the axes and perinaeum, and from fifteen to eighteen lines in length. It passes obliquely through the prostate gland, the tissue of which sustains its walls. It has the figure of a cone having its summit directed forwards, and is intimately attached to the intestine by cellular tissue and by the rectovesical apaneurosis. 25. A membraneous portion, contracted in calibre from eight to ten lines in length, connected with the rectum by dense cellular tissue below and helind; it approaches anteriorly the inferior region of the symphysis pubis, and the anterior fibres of the levatores and muscles. It rests upon the vestculm seminales, and is connected with them by an aponeurotic lumina. In this place there occur between it, the bladder and the symphysis pubis, large veins and loose cellular tissue. 37. A spongy portion (corpus spongrounn weethrie) which expands autoriorly to form the glass. It commences posterorly before the inferior extremity of the rectum, (to which it is attached partly by means of the sphineter ani,) by the bulk of the weeken, placed immediately under the angle of union of the every of the corpus cavernosum, above the two acceleratores uring muscles and the skin, between Cowper's glands, and insensibly loses itself anterisrly in the rest of the spangy tissue. This portion of the canal is afterwards in relation inferiorly with the septom of the dartes and skin. Its upper part is lodged in a groove of the corpus cavernosum. Interiorly, the crethra has not the same breadth in its whole course. From being pretty wide at its commencement, if contracts, and again dilates in the centre of the presente. The membraneous portion which comes next is much narrower than any other part of the canal, which is wider from the bulb to the base of the gians. There, immediately before opening, a decided dilatation occurs, named the form unricularis;

its orifice again contracts. In the interior two median whitish lines may be observed, a superior and an inferior. In the membraneous and spongy portions, somelongitudical wrinkles are soon, which are effaced when the mucous membrane forming them is distended, and which do not extend into the fossa navicularis. The inferior median line ends posteriorly at an oblong rounded prominence, about an inch long, called the sermsontanum (caput Gallmagnas). This prominence is formed by the mucous membrane, and contains in its most retired part a lacuna. Anteriorly, it becomes thin and ends in a point. The oblique orthers of the ejaculatory duets are placed upon its sides, those of the prostate gland are soon at its surface, arranged in the form of a semi-circle, and anteriorly, those of Cowper's glands. All these orifices are destinate of valves. Sometimes only the summit of the ridge is drawn back upon itself, so as to cover with a kind of propuce the aperture of the ejaculatury ducts. The urethra is lined by a warous membrase, which is backed, in its first two portions, by a cellular membrane, and in the last, by a layer of a soft and spongy tissue. This membrane is continuous with that which covers the glans, with the inner cost of the bladder, and with the membranes which line the ejaculatory and prostatic duets, &c. It does not adhere firmly to the subjacent parts, excepting towards the glass and in the prostate. Its colour varies according to the different parts where it is examined, being of a bright red near the external orifice, very pale and whitish in the rest of its extent. It is folded upon itself in the direction of its length, and furnished with small holes (sinuses of Morgogni), which are the oratices of the oblique ducts placed in its substance. These duets appear to be lacung, for they are not seen to proceed from follieles, as is the case in many other mocous membranes; they begin opposite the bulb, and become more abundant as far as the fessa navicularis. The mucous membrane is delicate, so as not to be distinguishable from epidermis, and traversed by a number of minute blood-vessels. The cellular wembrane seems to arise from the white tissue peculiar to the neck and triangular space of the bladder, and at first separates the mucous membrane

from the tissue of the prostate gland. Opposite its membraneous portion, it becomes dense, and is strengthened by the libres of the levatures ani, acceleratures uring, transverst peringel and sphineter ani muscles. The spongy fixing surrounds the three onterior fourths of the length of the wrethra. It commences by forming the balb, then diminishes in thickness, and constitutes a uniform and cylindrical layer. as far as the glass. Beneath the fosse navicularis, it becomes thin, and collects above and behind to form the glans by expanding. It is attached to the corpus cavernosum by a number of blood-vessels which it receives from that part, and by a lamina of its fibrous membrane. The cellules of this tissue are large in the glans, but small in the rest of its extent. Mr. Hunter proved it to be composed chiefly of dilated veins. The arteries of the urethra come mostly from the internal pudic; the largest branches ponetrate into the bulb. Its yours follow the course of the arteries, and its lymphatin vessels go to the inguinal and hypogustric plexuses. Its nerves come from the pudic and inferior gluneal,

c. The GLASS (Bulunus) of the penis is continuous with the corpus spongiosum arcthra, and forms the extremity of the penis. It is circumseribed by a prominent edge, the rouse glassis, behind which the inner membrane of the prepare forms a call desac by being reflected. Beneath the arcthra, the corona glassis is interrupted by a small gracese extending to the arifice of that canal, and filled by the formula proportii. The glass is invested by the muccon membrane of the propose, which, over it, is thin, rather dry, destinue of mucous crypts, and several by a very delicate opidermis. Its internal tissue is spongy, creetile, and of the same mature as that of the corpus spongiosum arethra, only it

appears firmer and denser,

410. Famous Gavenarive Ougass. As there are so many analogous parts in the dissection of the female pelvis to those of the male, we shall confine our discription to the organs of generation premising that the dissection of the female polyis and its contained organs must be conducted much in the same way as that of the male: 1% By examining the external organs and periments. Et. By a lateral me-

tion of the pelvis, removing the belt or innominatum, The external female ports of generation are the vulva or pudendum, mons veneris, greater labia, fourchette, form navicularis, vestibule, clitoris and its prepuce, smaller labia or symplac, orificium wrether, and srificium vagina, together with the very short female perinaeum; these parts do not require any minute deacription here. The aphineter and is dissected as in the male. The other muscles met with here are, the erector elitoridis and sphineter vaginar. A view of the pelvic viscera is obtained, by making the lateral section as directed in the male. Introduce a tube into the urethra, and lay it open as far as the bladder; the vagina and the rectum may also, after being carefully cleaned and examined externally, be laid open longitudinally. The female needless is about an inch in length, and comparatively of a simple structure; it is slightly curved, and a slight membraneous fold at the orifice forms a kind of imperfect valve. At the entrance of the vagina is occasionally found the Apmen; this varies in its shape; its presence is not a test of virginity, nor does its absence imply the embraces of the male. The caroneulae myrtiformes are small reddish tubercles, considered as the remains of the hymen.

a. The Vagraa is a cylindrical curved canal, varying in length and capacity, according to the stature of the person. It is thought that different races of women present considerable and constant differences in these respects. Composed of a mucous membrane internally, and a celluloso-fibrous tonic externally. Anteriorly and posteriorly, partially invested above by the peritoneum; anteriorly and inferiorly, it is in coutnet with the bladder and neethra; posteriorly and inferiorly, it rests upon the rectum. On the sides, it corresponds above to the broad ligaments of the uteres, and below to a mass of cellular tissue which separates it from the levatores and muscles, and in which creep the uterine and vesical vessels, and the umbilical artery-The walls of the eavity of the varies are in contact with each other in their ordinary state, and invested with a

The creeker classical corresponds in its details to the creeker penis. The upbender region is almost always distinct; it does not surround the online of the ragins.

more or less thick layer of mucus. The anterior wall is intersected longitudinally and in the middle by a narrow and elongated ridge, more distinct on the side next the vulva than near the uterus; in the former direction it frequently forms a tubercle beneath the critice of the urethra; on the posterior wall a similar but less apparent ridge is observed. These two walls present also, transverse wrinkles, efficed on the sides, more prominent and numerous in the vicinity of the valva than near the uteros, where they follow various directions. All these ruge are intersected at right angles by the two longitudinal ridges of which we have spoken, and are formed by the mucous membrane which lines the canal. The upper extremity of the l'agino is fixed around the upper part of the neck of the uterus, a little higher behind than before. The lower extremity forms in the vulva a fissure clongated from above downwards, and from before backwards. The mucous membrane is evidently continuous with that of the pudendum inferiorly, with that of the aterus superiorly. Its artery comes from the internal iliac, and its nerves from the sacral plexus.

n. The UTERUS. The ligamenta lata ateri are folds of peritoneum placed in the excavation of the pelvis, and form with the uterns and upper part of the vagina a transverse septum which divides that ravity into two parts, on anterior for the bladder, and a posterior for the rectum. They are continuous with the peritoneum which invests the two surfaces of the aterus, and externally are expanded upon the sides of the excavation of the polyin. They are formed of two lamine placed back to back. in the interval of which is contained cellular tissue rarely containing fat ; also between these two laminer are placed, on each sale and superiorly, the Fallonian tubes, then beneath, interiorly the round ligament, and posteriorly the ovary. The tube occupies the free edge of the ligaments; the other two organs raise each of their surfaces angularly, and thus form two smaller folds which are named fittle wings. Besides these folds, the peritonoum forms others rounling towards the rectum : these are sometimes called the ligaments of Douglass. The Round Ligaments arise from the lateral, superior and anterior part of the uterns, beneath and before the insertion of the tubes. They direct themselves from thence towards the inquiral ring, pass through it, and terminate by expanding in the cellular tissue of the groins, Mons Veneris, and laba podeods. Many torturous vessels creep among these fibres. Fallopius asserts that these cords are caveloped by a kind of cremaster muscle. If the student wish now to examine the remaining organs, together with the uterus, systematieally, they must be removed from the polvis, but not until the pelvic fascia, levator ani muscles, and vessels and nerves of the pelvis have been dissected. The Literus (mutrix,) is a hollow, symmetrical organ, of the shape of a truncated cone, placed in the middle of the pelvis, between the bladder and rectom, above the vagina, and benenth the inferior convolutions of the small intestine, flattened from before backwards, and ovarly an inchin thickness. About two inches broad in its highest region, it contracts towards the vagina, and terminates by a narrow elongated portion, the week. The body of the Cierus is less than two inches in length, its two surfaces are convex, the anterior more so than the posterior, and invested by the peritoneum; the former is in contact with the bladder, and the latter with the rectum. Its lateral edges are convex, directed downwards, forwards and inwards; correspond to the interval of the two lamine which compase the broad ligaments. Its upper edge, (fundus) is rounded, transverse, convex in the direction of its length, and covered by the peritoneum. By its union with the lateral edges, it produces two slightly projecting angles, in the middle part of which terminate the Fallopian tubes, above the insertion of the ligament of the ovarium which is behind, and of that of the round ligament which is before. The neck of the airray is continuous at the exterior with the body, from ten to twelve lines in length, antero-posterior diameter from six to eight, transverse from eight to ten. Slightly inflated at its middle part, it is compressed from before backwards and of a cylindrical form. Its upper part is embraced by the vagina; the rest projects into that canal. This latter portion is more or less prominent, presents at its summit a transverse slit (as tiness), bounded by two rounded lips (fabla) placed close to each other, and

distinguished into anterior and posterior; both are smooth and rounded in women who have not had children, wrinkled in those who have been repeatedly brought to heat. The energy of the atterns is small in proportion to the volume of the organ, which necessarily supposes a great thickness of wall; it occupies the body and neck, and terminates inferiorly at the slit of the ne tinese. The portion of this cavity, which corresponds to the body, is triangular and flattened; its edges are curvilmear, and its upper angles present the extremely minute orifices of the Fallopian tubes. Each of its surfaces is longitudinally traversed by a superficial line. The eavity of the neck is continuous with that of the body; it is nearly cylindrical, slightly compressed from before backwards, and dilated before opening into the vagina. It presents, upon its anterior and posterior walls, the continuation of the prominent vertical lines of which we have just made mention, together with some scarcely perceptible transverse rugge. The Uterus is composed of an external or serous membrane, an internal mucous membrane, an intermediate proper tissue, nerves, and vessels. The serous membrane is formed by the peritoneum. The wacons membrane is a prolongation of that of the vagina; many many matemists doubt its existence. It sends into the Fallapian tubes two prolongations which we shall subsequently examine. Its culour is white, very slightly tinged with red, especially manifest some days before and during menstruation. It is covered with a number of fine villosities, and presents the orifices of mucous crypts, which are more a unilant towards the neck than elsewhere. Frequently also these crypts dilate in that place, and assume the form of small semi-transparent vesicles projecting into the interior of the uterns. The proper tissue occupies the interval which separates the peritoneum from the murous membrane. Its thickness amounts to five or ax lines. It is of a dense and close texture, and violds great resistance to the knife. It is elastic and of a gravish white colour. It adheres to the mucuus membrane, and its latimate untuvo is unknown. It is traversed by a number of blood-wassels. The arteries of the aterus come from the spermatic and bypognatrie; they are very flaxuous, and

anastomose frequently together. Its voins follow the same course, but are still more flexuous, and form envities in its walls, which become very large during gestation, and are called attende sixuses. Its nerves come from the sciatic and hypogastric plexuses. Its lymphatics are very numerous, and during gestation

acquire enormous dimensions.

c. The Fallopian Tubes (Tube obvious) are two canals floating in the abdomen and placed along the upper edge, and in the duplicature of the broad figaments. They extend from the upper angles of the cavity of the nterus to near the sides of the upper strait of the pelvis. In the inner half of their length, they are straight and of very small diameter, afterwards acquire the size of a writing quill, and become flexuous, before terminating they contruct again. Their free extremity is wide, floating, and fringed, honce called the fimbriated extremity of the tube (Morsus Diaboli.) Among the fimbrin of this part, one is observed longer than the rest, attached to the corresponding extremity of the ovary. The surface of the fimbriated extremity of the tube is generally directed backwards. These tubes contain interiorly a canal commencing at the upper angle of the cavity of the uterns. Almost capillary in its first half, it afterwards dilates and opens at the surface of the fimbriated extremity by an orifice, (ostivm abdominale), the only place in the body where a serous membrane communicates with the exterior. The Fallopian tubes are internally fixed by a mucous membrane; suft, reddish, and slightly villous, and presenting several longitudinal plies. Externally, these organs are formed by a thin layer of a spungy and erectile tissue.

b. The Ovantes (Osaria,) are two egg-shaped bodies, placed in the substance of the broad ligament. They are compressed from before backwards, of a pale red colour, wrinkled and rough at their surface. Their outer extremity gives attachment to one of the fimbriae of the morsus diaboli; the inner is attached to the oterus by a small filamentous card about an inch and a half long, entirely solid and called the Ligament of the Ocury. The overty is enveloped by a done, callula-filamentous membrane, the inner surface of which sends a number of prolongations into their parenchyma. The paren-

chyma is soft and spongy; when torn, seems composed of cellular and vascular lobules, of a grayish colour, garged with fluid. In the midst of these lobules, are lodged from filteen to twenty small vesicles (erricula a order Granform), transparent, of the size of a millet seed, and formed by a delicate pelliele, in which is contained a viscid fluid, of a reddish colour.

For the anatomy of the rectum, pelvic fastin, levator ani, blood-years, and norves of the female pelvis, see

the corresponding parts in the male.

411. NERVES OF THE ARDOMEN AND PELVIS. This is an extremely troublesome dissection, and is seldom performed well in any disserting room. The nerves supplying the walls of this eavity and its contents, are of three kinds. 1º. Cranial nerves. 2º. Spinal nerves. 3". Sympathetic nerves. Presuming that the student is quite familiar with the anatomy of the abdominal and polyle viscera, he will experience little difficulty in trucing the larger branches of these nerves. 15. The nervi vagi, or rather the gastric portions of the nervi vagi having formed the assoplageal cords, as has been already described in the dissection of the thorax, enter the abdomen by the exophageal prifice of the diaphrogm. The right is larger than the left, and is attached to the posterior orifice of the gullet. It forms a complicated plexus, from which branches proceed to the stomach; likewise to the sular plexus, and to many of the secondary plexuses arising from it, viz. hepatic. splenie, codiac, right gastro-epiploie; some expand upon the vena portic, or go back to the panereas, duodenum, and gall bladder. The left asophageal cord passes anterior to the gullet; its branches go to the gomach, or communicate with these of the right aide, or join the hepatic plexus. 2º. The sympathetic nerves within the abdomen most be next dissected. Commence by finding the main trunk itself passing on each side from the thorax into the abdomen, generally along with the pseus muscle, and behind the ligamentum areastum breve or internum; and at the same time look for the passage of each of the splanchnic nerves also through the disphragm, they are generally covered by the supra-renal capsules. These form a key to the dissector, of all the sympathetic perves within the abdomen and pelvis. We shall commence with the examination

of the splanchnic perves. The great splanchnic nerves, two in number, must be traced to the semilunar ganglion, and solar plexus, in which they terminate. smaller splanchnic, also two in number, have a similar termination. Having examined the semilunar ganglion and solar pleans, (for which, and all other parts of the sympathetic system of nerves, see the " Account of the Nervous System") trace from it generally along the course of the various blood vessels the plexuses to which it gives rise; theseware the sub-diaphragmatic, corliac, hepatic, splenic, superior mesenterie, inferior mesenteric, renal or emulgent, and spermatic plexuses. Let the student next return to the continued trunk of the sympathetic nerve, and to its ganglion. Having traced it from the thorax into the abdomen, where it is generally much curved, and very small, as it passes behind the dianhragm, it descends a short way, and then joins the first bushar gauglion. These gauglia are commonly five on each side, near the inner edge of the pseus amgnus, behind the venu cava on the right side, and the aorta on the left; they all communicate with each other by rawi communicantes. From these ganghis proceed filaments, viz. external and internal. The external cross the lumbar arteries, before which they pass to join the anterior branches of the humbo-spinal Some filaments go to the psons magnus. The internal Floments from these ganglia are numerous and They form the nortic please, which is continued into the hypogastric plexus. By tracing the sympathetic into the pelvis on either side, the sacral ganglia, and those communicating branches connecting them to each other, and to the last lumbar gauglia, are easily made out. There are three or four sacral ganglia on each side. They lie in front of the sacrum, immersed in fat and cellular substance. The first communicates with the inferior lumbar ganglia; the last is isspor-the sympathetic perves on each side running into it. It lies in front of the superior coccygeal vertebra. From these ganglia arise external filaments which anastomose with the sacro-spinal nerves, and internal filaments which join those of the opposite side upon the middle of the sterum. The hypogastric plexus is remarkable for its complexity. It is formed by

filaments of the vesical, uterine vaginal, and harmorrhoidal plexuses. It sends its ramifications to the rectum, bladder, vesiculæ seminales, uterus, vagina and anus. M. Muller has shewn that branches may also be traced to the penis. The spinal perves within the abdomen and polvis are not difficult of dissection; their branches proceed chiefly to the muscles forming the walls of the abdomen and pelvis, and to the muscles of the lower extremities; likewise to the integuments of all these parts. Begin by examining the lumbar nerves, cutting away cantiously the pseus, taking care to remove the os innominatum, or a portion of it, on one side; this is generally the left. Clean these nerves, carefully preserving as many of the more superficial branches as may be. To do justice to this dissection. remove the hodies of the two last dorsal vertebre, and those of all the lumbar vertebra. Open the theca or dura mater of the modulla, and examine the roots of the lumbar nerves, as they come from the medulla, previous to their passing out of the canal by the foramina conjugalia.

412: Lemban Nerves. Of these there are five pairs, reckoned numerically, from above downwards. The first leaves the vertebral canal by the formalina conjugatia formed between the first and second lumbur vertebrae, and the fifth by the same openings formed between the last lumbar and first sacral vertebrae. Their posterior branches chiefly supply the muscless of the back; their naterior form a plexus, bushar plexus, from which arise the following nerves. 1°. His scrotal. 2°. Middle branch. 3°. Inguino cutaneous. 4°. Gentito-craral, or external spermatic. 5°. Anterior crural.

6. Objurator, 7c. Lumbo-sacral.

413. The Sachal Nerves vary in number from four to six on each side. Their posterior branches are very small, and pass out of the canal by the posterior sacral foramina; the anterior branches, which are chiefly very large, together with the lumbo-sucral nerves, form the scialle or sacral please. From this arise branches which may be divided into anterior and posterior. The notation are the homographical, the vesical, utering, and vegucal nerves. The posterior are the small sciatic and

its branches, the pudic, and the great sciatic. For the further account of this nerve, see the "Dissection of the Lower Extremity." This nerve terminates the sacral plexus, and escaping from the polvis by the great sciatic notch, beneath the inferior margin of the pyramidalis, after passing in front of this muscle, to which it sends filaments, next places itself behind the genelli and obturator internus, between the tuber-ischii and great trochanter. Its further dissection, to gether with that of the obturator and crural nerves, belongs to the anatomy of the lower extremity.

PART VIII

DISSECTION OF THE HEAD AND NECK."

414. The dissection of the head and neck is that with which the student generally, and very properly, completes his anatomical studies. In his first dissection of this part, he should confine himself strictly to the anatomy of the muscles and larger organs, such as the parotid, thyroid gland, &c. During a second, and even a third examination of the same parts upon different subjects, he may then examine the anatomy of the atteries and nerves. These repeated examinations will make him also master of the surgical anatomy of these important regions. Let the dissection be commenced with the soft parts situated over the calvarium. The hair having been closely removed, make an incision through the integuments merely, from the external occipital protuberance to the extremity of the nose, along its dorsum.

It is presumed, that the statest, previous to commercing the dissection of the fore part of the head and arck, with which this section is chiefly occupied, has already dissected the muscles on the back of the neck. For a minute account of them, we the section, "muscles of the back."

A second incision, between the extremity of the first and the back part of the cartilage of the ear, a third incision from the vertex or top of the head to the root of the zygomatic arch, and a fourth, from the ront of the nose along the superciliary ridges in a semicircular direction towards the external augular process of the frontal bone, and a short way above the eye-brow, The greatest care must be used in dissecting off these flaps of integament; the cellular substance connecting them to the subjacent muscles and tendons being extremely dense, close, and granular, similar in some respects to what is found over the palmar and plantar aponeuroses. Having removed the integements carefully, the student will find them of great thickness and extremely vascular, it being in this part of the body more than in any other, that arteries of considerable magnitude approach the surface for the purpose of supplying the integuments; this is obviously caused by the peculiarities of the hairy scalp, and the necessity of an ample supply for the nourishment of the hair. The bulls of the hair may be seen mostly in the subcutaneous cellular substance, and their presence, together with that of numerous schaceous follieles, contribute, no doubt, to give to the bairy scalp its peculiarities both of structure and discuses. That the hairy scalp moves either by the action of its own muscles or by the hand, is dependent on the longuess of a religiar tissue between the epicranial aponeurosis and the perieranium; thus the epicranial muscles and aponeurosis move along with the hairy scalp. The student must now proceed to clean the following muscles .-

415. Occupate properties; although this muscle is availly described as one, it is, in fact, composed of Eur; viz., two occipital and two frontal, with a common central aponeurosis—the epleranial aponeurosis; the whole might with propriety be called, the muscles epicranius; clean the muscles, as usual in the dissection of their fibres, and commence with the occipital portions. The occipitalis is situated at the puterior part of the cranium, behind the mastaid process, and shove the upper curved line of the occipital hone, it is altached by short aponeurotic fibres in the outer part of that line, and to the neigh-

bouring region of the temporal bone, above the splenius and sterno-cleido mastoideus; it terminates above, after a short course, in the epieranial aponeurosis. The integuments, and sume nervous filaments cover it, together with a thin layer of the epigranial aponeurosis, beneath it we find a similar layer of the same part; secondly, the perieranium; and lastly, the accipital and temporal hope. Its action is to stretch the aponeuroses and to alternate with the frontalis muscle. Next clean the frontalis. This muscle covers the forehead, it is thin, square-shaped, adheres strongly to the skin; superiorly it terminates in the epicranial aponeurosis, inferiorly the fibres units with the pyramidalis mani, orbicularis palpebrarum, and corrugator supercilii; thus it is the antagonist of these muscles. It moves the scalp freely, and by its action produces the transverse wrinkles of the forehead, it also is enclosed by a thin sheath or splitting of the epicranial aponeurosis. The integuments cover it anteriorly, its deep surface covers the supra-orbitar vessels and nerves. The energains apparentusis is the broad tendinous expansion which connects these four muscles to each other, it adheres strongly to the scalp, but very loosely to the parts beneath it; anteriorly the frontal muscles are inserted into it; posteriorly, the occipital; laterally, the superior muscles of the car; upon the temples it degenerates into common cellular membrane, and becoming thinner and thinner, is lost upon the face. The aix arteries supplying the scalp, lie above it, together with the integuments; beneath it is a quantity of lax cellalar substance containing nu fat, and connecting it loosely to the perioranium and to the temporal aponeurosis; the fibres composing it are white and parallel postes riorly, but in other parts interpoven and indistinct; the intervals which occur between the bundles of its fibres contribute to render its dissection difficult; lastly, as we ligve seen, it furnishes this sheathes for the museles just described. The next muscles to be described are the extreme muscles of the ear, so named as they proceed from other parts towards the engiteds.

416. The Superaton Acrats, or studies assiculars, is siinated on the temple, above the ear. Thin, membranous, and angular, attached by its summit to the fore and inner part of the fibro-cartilage of the ear, on the convexity which is formed by the upper part of the concha, ascends from thence, in a radiating manner, to the opticranial aponeurosis, where it terminates. The outer surface is covered by the skin, the issue cavers the aponeurosis, of the temporal muscle. Its action is to raise the ear.

417. ANTERIOR ADRIS, (price our icuhe), is of the same form as the preceding muscle, but less apparent, and is situated on the temple, before the ear. Its nummit is attached to the fore part of the helia, and from this point its filtres proceed, to terminate on the outside of the epicrunial appreurosis, near the frontal muscle. Its outer surface is covered by the skin; the inner is applied upon the temporal muscle and artery. Its apper edge is confounded with the preceding muscle, while the hover is lost in the cellular risons above the zygomatic arch. It carries the ear forwards and upwards. Next dissect

418. The Posteriou Auris (Muncul Retrakentes Auriculosa). This muscle consists of one or more small bundles of fleshy fibres, thin, flat, or fusiform, rather irregular, and situated behind the ear; attached by short aponeurous to the masteid process, whence they proceed horizontally forwards to termimate at the lower part of the convexity formed by the concha of the ear by aponeurotic fibres or small tendons. They are covered by the integuments, and are separated from the temporal hone by cellular tissue. This muscle, which has no connexion with the epicranial aponeurosis, carries the ear backwards. To dissect this muscle, the student will require to draw the external car forward with hooks. The intrinsic muscles of the ear, viz. those which pass from one eartilage to another, will be described along with the organ of hearing, as being interesting only in a physiological point of view. The vessels and nerves, which supply this region of which we have just examined the muscles, are chiefly the temporal, posterior, nurioular, and occipital arteries; the branches of these vessule proceed mostly to the hairy scalp; weins having the same names accompany them; the nerves are derived from the portio-dura (7th), ophthalmic division of the

5th, and the necipital brunches of the cervico-spinal

419. REMOVAL of the BRAIN and Dissection of the Face. If the student be desirous of examining the brain of the subject he is disserting, he must at this stage of the dissection take off the skull-cap, and in the usual way remove the brain. Ha will, however, in doing so, destroy the temporal muscle and its aponeuroses, which should therefore, if pussible, be rapidly cleaned and examined. Having removed the brain, it ought to be preserved in alcohol of sufficient strength, until such time as he can return to its examination with advantage, and he may now proceed with the dissection of the face. Commence the dissection by an incision round either orbit; a accord around the mouth, which eavity must be filled with baked hair or some such substance, and neatly stitched up; a third incision is to be carried from the angle of the mouth to the temple, and a fourth to the angle of the jaw. Remove cautiously the flaps of integuments from these surfaces, and commence by the dissection of the orbicularis pulpibrarum. integuments over this muscle are very fine, and the substratum of cellular structure may be observed to be without fat; clean the fibres in a semicircular direction, commencing at the external canthus of the eye, and tracing its fibres inwards towards the internal canthus, where a tendon will be found attaching them to the nasal process of the superior maxillary bone; this rendon lies over the lachrymal sac, and must be cleaned with great care, inasmuch as it is a minute structure.

420. The Orangulanes Parennarum surrounds
the base of the orbit, and occupies the greater part of
the upper and lateral region of the five; bread, thin,
and circular, slit transversely in the middle for the
operature of the eyelids. There are three distinct
points of origin internally for its floshy fibros; 1 st. at
the ascending process of the upper maxillary hone,
and internal orbitar process of the frontal; 2dly, at the
anterior edge of the lachrymal grouve and the neighbouring part of the base of the orbit; 3dly, at the two
sides and fore part of a small tendon (tendo palpebrarum), about half a line broad, and two lines long,
stronger toward its point of attachment than the place

Where it terminates; this tendon proceeds transversely outwards, from the anterior edge of the lachrymal groove, to the internal commissure of the cyclids, where it bifurcates to be continued with each of the fibro-cartilages, situated in their substance. Posteriorly, this tendon adheres intimately to a thin aponearosis, which covers the lachrymal sac, and also gives rise to some fleshy fibres, and was formerly called the reflected tendon of the orbicularis palpebrarum. After originating in this manner, the upper and lower fibres of the muscle proceed, in opposite directions, to the upper and under parts of the base of the orbit, and following its enevature, unite at the outside of the external commissure of the palpebras. The middlefibres, which are less distinct, much less curved, and always very pale, are distributed in the substance of both cyclids, and also unite below the outer commissure by a tendinous line, sometimes of considerable size. This tendinous line occurs very rarely; it is denied by Cravillhier, but I have seen it twice distinetly. All these fibres describe concentric curves, whose centre corresponds to the aperture of the eyelids, where they are much shorter. Those which are nearest the circumference are almost circulary the others describe a sort of ellipse, and the more central do not even go so far as the commissures of the palpehere. The unterior surface of this muscle is covered by the skin, an which it is intimately united above, while below it is separated by fat; and in the place which corresponds to the eyelida is in connexion with a very delicate laminar cellular trane. The posterior surface is applied superiorly upon the corrugator supercilii, to which it adheres; lower down, upon the legamentum intum and fibro-cartilage of the upper cyclid; externally, apon the external orbitar process, and the aponeurosis of the temporal musele; below, upon the check bone, the evgenuatic muscles, the levator labit superioris, the leentor labit supertorie alieque nast, from which it is separated by the facial vein, and upon the ligament and the fibro-eartilage of the lower eyelld; internally, upon the ascending process of the superior maxillary bone, and the lachrymal suc. Its circumference is confound; ed, above and helow, with the pyramidalis nasi; then

a little more outwards, with the autorior edge of the At its lower part, it is free, and some irregular busiles of fibres are detached from it, which are lost in the redular tissue of the shock, and describe curves whose convexity is below; some of them unite with the zygomaticus minur. The orbicularis palpebrarum carries the syolids toward each other, bringing them over the fore part of the eyehall, upon which it applies them, wrinkling them more or less. It also depresses the eyebrow at the same time that it raises the check, and renders it more promicent. determines the course of the tears toward the inner angle of the eye. The musting of its action allows the eyelids to open. It is the antagonist of the levator pulpebne superioris. Remove this muscle cautiously from without inwards, and from above downwards, and

thus expose

421. The Changgaron Supercular, short and thin, describes the same curve as the superciliary arch of the frontal bone, on which it lies. Internally, it is attacked toward the masal prominence of the same bone. by an extremity sometimes simple, but most commonly divided into two or three portions. It terminates in a pointed form, about the middle of the orbitar arch, where it is confounded with the frontalis and orbicularis palpebrarum. Its auterior surface is covered by these two muscles, and, a little inwards, by the pyramidalis nasi. The materior surface covers the frontal bone, superciliary artery, and frontal branch of the uphthalmic nerve. It draws towards the mose the skin of the eyehrows, the hairs of which it ruises so as to shade the eye. It acts especially in the depressing passions. At this stage of the dissection, a portion of the tensor tural may be exposed, but this muscle cannot be well soon until both evelids have been cut through about the middle, and reflected towards the nose, and the mucous membrane covering the surface of the eyeball dissected from off the internal canthus of the eye; this, with the removal of a little collular

substance, will expose the

422. Texson Taxat. This mastle was not discovered by Homer, but by Bosenmullar. It arises broad, square, and fleshy from the on magain, near

its junction with the orbitar plate of the etheroid, and after a curved course, divides into two fasciculi; one to each syelid. These fasciculi run along the inner edge of the tarsal cartalages, until they are lost by uniting with the fibres of the orbicularis muscle. Use: The muscle is supposed to draw the punta lackey making and eyelids into close contact with the eyeball, and to

compress the lachevnual sac-

423. Prhamidalis Nasi, sinuted at the rost of the nose, regarded by many anatomists as an appendage of the frontales muscles. At its upper part it covers the nusal hones. The two pyramidales muscles are united above, but separate lower down, terminating in a diverging manner in a membranous tissue rather cellular than fibrous, which occupies the sides of the nose, and also receives the fibres of the triangularis sasi. Externally, they are intimately united with the orbiculares pulpebrarum. User it gives to the frontalis a fixed point, and contributes a little to the motions of the nose.

424. TRIANGULARIS NAM (Compressor or Dilator Nasi) is thin, flat, and triangular, and is situated upon the sides of the nose. It arises internally of the fossa canina by a short and narrow aponenrosis, from which proceed in a divergent manner the fleshy fibres, which issuing from beneath the levator labit superiores alreque nasi, cover the back of the nose, describing a curve whose convexity is directed unwards. The superior fibres, which are longer, ascend, and the inferior, which are shorter, are horizontal; they gradually degenerate into a rather loose aponeurotic expansion, which covers the nose, adheres to it, and is continuous with the pyramidalis nasi and the muscle of the opposite side. One of its portions is attached to the fibrocartilage of the wing of the nose. Its anterior surface is covered by the skin, and a little by the levator communis muscle; the posterior is applied upon the superior maxillary bone, and upon the lateral cartilage of the nose. Anatomists have attributed entirely opposire uses to this muscle. Its true action is to draw the wings of the nose outwards, and thus to dilafe the metrils. This muscle is exposed by detaching the inner part of the following.

425. LEVATOR LARIE SUPERIORIS ALEQUE NASL usually called the Lendor Communis; this muscle is a thin triangular fleshy bundle, contracted at its upper part, and breaster below. It is situated on the sides of the nose. It arises above from the outer surface of the ascending process of the superior maxillary hone, beneath the tendon of the objentaris palpebrarum, as well as from the anterior edge of the lachrymal groove and lower part of the base of the orbit, by short aponeuroses, succeeded by the fleshy fibres, which descending obliquely outwards in a diverging manner, are partly attached to the fibrous membrane, fibro-cartilage, and even skin of the wing of the nose, and partly lose themselves in the upper lip, passing before the orbicularis oris. Its unterior zurface is placed beneath the skin, to which it adheres intimately below. At its upper part alone, it is concealed by a portion of the orbitularia palpebrarum and by the labial sein. The posterior surface covers the preciding muscle, the ascending process of the superior maxillary bone, the edge of the locator labii superioris, the depressor alse nasi, a part of the orbicularis oris, and some brunches of the infra-orbitar nerve. It raises the upper lip and the wing of the nose, which it also draws a little out-The next muscle,

426. The LEVATOR LABIT SUPERIORIS lies to the outer side of the last described, and some anatomists have viewed both as one muscle, but this is incorrect, since its fibres follow a somewhat different stiruction, and the following description, which is strictly anatomical, proves that it merits to be classed as a different muscle. This muscle is thin, flat, rather short, and of an irregularly quadrilateral form. Attached above the infra-orbitar foramen, over an extent of about an inch, to the malar and upper maxillary hones, by short aponeurotic fibres, frequently divided into two, and sometimes into three fasciculi. Thence it descends, contracting, downwards and inwards, to the corresponding lip; where it is confounded with the orbicularis oris, between the nose and the commissure. Its anterior surface is covered at its uppur part by the orbicularis pulpelgarum and labial vein, and below by the skin, to which it strongly adheres. The posterior surface is in connexion with the levator anguli oris, from which it is separated by the infra-orbitar results and nerve, as well as by a great quantity of adlpose tissue. It also occurs the depressor labit superioris et also masi. Its inner edge is often confounded with the levator labit superioris alseque nasi, and the outer frequently united to the sygometicus minor. It raises the upper lip, carrying it a little outwards. Detach the levator labit superioris from the edge of the orbit, and reflect it toward the nose,—this will expose the

427. Levator Ascitta Onto or (Masculus Caninus). This is a small clongated flat muscle, broader and thinner above than below, attached, beneath the infra-orbitar hole, by short aponeuroses, to the fossa canina, from which it descends obliquely outwards to the commissive of the lips, where it seems to be continuous with the triangularis, although some of its fibres are interlaced with those of the orbicularis aris, zygomaticus major, and buccinator muscles. Its asterior surface is covered above by the preceding muscle, and the infra-orbitar vessels and nerves, and below by the zygomaticus minor and skin. The posterior surface covers the fossa canina, the mucous membrane of the mouth, and buccinator. It raises the commissions of the lips and carries it inwards.

428. Zynostatucus Mixon. This muscle does not occur in all subjects. It is situated internally of the zygomaticus major, and above it, is flat, clongated, and thin. It arises from the outer surface of the malar bone, or from the orbicularis palpubrarum, and descends obliquely inwards, terminating in the lovator labil supersoris, or in the orbicularis oris. Its universal marfine is covered by the skin and orbicularis palpubrarum. The posterior covers the malar bone, the lovator anguli oris, and the labial vein. It runs parallel with the aygomaticus major. It ruises the upper lip and draws it

outwards.

429. Zyoomaticus Mann. Is chingsted, slender, rounded, attached by aponeuroses, below the outer surface of the malar bone, near its posterior angle; becoming a little brander, it descends inwards and forwards, and terminates at the commissure of the lips, where it is continuous with the levator anguli orls, depress.

anguli oris, buccinator and orbicularis, sometimes hifurcating. Its anterior surface is conscaled above by the orbicularis pulpelmarum, and farther down by the skin, from which it is often separated by an enormous quantity of fat. The posterior surface covers the malar bone, the masseter and buccinator muscles, the labial voin, and a more or less considerable mass of adipose tissue. It raises the commissure of the lips, which it carries backwards and outwards. It acts principally in laughing,

430. The Depression Larm Supernous et Ana:
Nasi. This is a small fleshy bundle, somewhat irregular, placed beneath the wing of the mose and behind the upper lip. To expose it, the upper lip must be everted, and the nuccons membrane dissected from off it, close to the framum. It arises, by short aponeuroses, near the anterior masal spine, from a small fessa, whence it ascends in part toward the posterior region of the wing of the nose, and is partly confounded with the levator labii superioris abeque ansi and the orbitularis oris. Internally, its fibres are vertical, externally oblique. They are covered by those of the levator labii superioris alseque masi, and by the mucous membrane of the mouth, and are applied upon the superior maxil-

ary hone. It depresses the wing of the nose,

431. The Depresson Anoma Onts, or (Triangularis Labiorson,) is thin, flat, and triangular, with the apex superiorly, and the base inferiorly; arising from the external musillary line, between the masseter muscle and the mental hole, by short aponeurotic fibres, succeeded by fleshy fibres, some of which appear to come from the platysma myoides. These fibres ascend toward the commissure of the lips, those in the middle vertically, the anterior obliquely backwards, and the posterior from behind forwards. At the summit of the muscle, they are incorporated with the avgomatious major and orbicularis oris, but more especially with the levator anguli oris. The owter surface adheres strongly to the skin. The owner covers the platysma myoldes, buccinator and depressor labii inferioris, to which latter it is united. Close to its outer edge the fascial arvery will be found running over the base of the jaw, and proceeding in the same direction as the muscle. It lowers the commissure of the lips, and acts especially

in green.

432. The Depressor Labit Inventoris, or (Quadeutur Menti,) is situated to the inside of the presenting muscle, and is thin and quadrilateral. It arises from the external oblique line of the inferior maxillary hone, and ascends in the lower lip, where it is confounded with the orbicularis oris. Its fibres, which are parallel, and seem to be continuous with those of the platysma myoides, are directed obliquely upwards and inwards, uniting in the most intimate manner, internally and above with those of the opposite side, and internally and below with those of the levator menti, while externally and below they are interlaced with those of the preceding muscle. In the substance of the muscle there is much fat deposited, which, together with the paleness of its fibres renders it difficult of dissection. Its auterior surface is covered by the depressor anguli oris and by the skin, to which it strongly adheres. The pasterior surface is applied upon the lower jaw, the mental nerve and vessels, and the orbicularis oris and levator menti. This muscle depresses the lower lip.

434. The Levator Lant Infuntoris, or (Levator Mech.) is situated between the two depressores labii inferioris; short, thick, and conical. It is attached by its summit to the fossa, tendinous on the side of the symphysis of the chin, under the alveoli of the incisors. Its fibres diverge from this point, and are inserted into the skin of the chin, to which they strongly adhere, and where they produce the small hollows that are generally observed on that part. It is envered above by the mucous membrane of the mouth: internally is separated from that of the opposite side by collular tissue, externally, it is contiguous with the depressor labir inferioris and orbicularis oris; below, it lies upon the jaw, and is covered untersoriy by the integuments. It ruises the chin, and pushes the under lip a little upwards. Its

upper fibres also serve to invert the lip.

434. The Obsteurants Onts. This muscle forms the greater mass of the lips, and should perhaps be dissected immediately after the orbicularia palpebrarum; the terminations of the zygomatici, levatores labii,

levatores anguli oris, depressores labii inferioris, levatores menti and buccinators, which are interlaced in a very complicated manner, are incorporated with its proper fibres. It completely surrounds the mouth. Itsfibres correspond to the free edge of the lips; they are concentric, curved, and divided into two planes, one of which belongs to the upper, the other to the under lip. Viewed in connexion, they present an oval form, and intersect each other at their two commissures. Covered anteriorlo by the skin, to which it firmly adheres. The posterior surface is lined by the mucous membrane of the mouth, to which it is more loosely attached; it is also in connexion with the labial glands. Its free circumference is invested by the red membrane of the lips. Its great circumference is continuous on all sides with the muscles which we have just enumerated. Superiorly and in the middle, it is attached by some fibres to the lower part of the septum of the nose. Use: to bring the lips toward each other, and contract the aperture of the mouth, which it carries forward. It acts in suction, in playing upon musical instruments, &c. also acts as an antagonist to all other muscles of the lips. Detach the zygomaticus major and minor from the bone,-remove nautiously the fat and cellular substance lying in the hollow of the cheek, between the angle of the mouth and ramus of the jaw. In this dissection, the dissector will meet with many branches of the seventh pair of nerves, some of which may be preserved, but more especially the duct of the parotid, which perforates the bucelnator muscle at the distance of about three-fourths of an inch below the zygomatic arch. Having cleaned and preserved these parts for after more minute examination, and pulled backwards the anterior margin of the masseter, he will thus expose a sufficiency of the buccinator muscle to enable him to understand its general course.

485. The Buccharon is flat, thin; situated in the interval between the two alveolar burders. It is attached above to the posterior part of the upper alveolar border, from the last tooth to thesecond small grinder; below, to the same part of the lower alveolar border; in the middle, to an aponeurosis which descends from the summit of the inner wing of the pterygoid process, to the root of the coronoid process, and which receives on the other side fibres from the constrictor pharyngis superior. This tendon is called the inter-maxillary ligament. From these origins the fleshy fibres proceed toward the commissure of the lips, following different directions: the upper descending, the lower ascending a little, and the middle fibres passing horizontally forwards, meet at the commissure, where a marked interlacing takes place between the upper and lower, the former passing into the under lip, the latter into the upper, where they are confounded with the fibres of the orbicularis oris. Covered by an extremely thick layer of fat, without which the check would appear hollow, and which forms in the middle of the latter a sort of ball, appearing as if separated from the neighbouring parts. By this fat, its external surface is separated posteriorly from the coronoid process, and from the lower part of the temporal muscle; and in the middle, from the masseter. Anterierly, it is covered by the zygomaticus major, platysma myoides, and triangularis muscles, by the skin, labial artery and vein. A whitish membrane, formed of a fibrous cellular tissue, also covers it in its whole extent, adhering intimately to it, and prevents the buccal glands from being immediately applied upon it posteriorly. The inner surface is fined by the mucaus membrane of the mouth. Opposite the third molar tooth, it is obliquely traversed by the duct of the parotid gland. It draws the commissure of the lips backwards, and contributes to masticution, by keeping the food between the teeth. If the month is filled with air which distends the checks, it compresses it and drives it out, as in the action of blowing, sounding a trumpet, &c. Before proceeding with the dissection of the temporal, musseter, and pterygoid muscles, which are the great muscles of mastication, and can be exposed only by deep sections of the upper and lower jaw, the student aught to examine the anatomy and structure of

486. The Panorus Glands (right and left) are the largest of the salivary glands, of which we usually reckon six, placed around the lower Jaw. To expose

the parotid fully, an incision must be carried downwards from before the ear, a short way upon the neck, and this, together with the previous incision through the integuments of the face, will enable the student to display the upper part of the latissimus colli or platysma-myoides; by cautiously reflecting this from without inwards, he will find a strong facia underneath : this is the upper part of that important texture named the cervical facia. He will find this facia continuous with another facia covering the parotid. This latter facia is not limited to the surface of the gland, but sends prolongations into the interior of the gland, wherehy its lobules are partially separated from each other, and moreover adheres to the cartilaginous lobe of the ear, and to the zygonistic process of the temporal hone. The parould is situated partly before and partly beneath the external car, filling up the thep excavation on the sides of the face, between the posterior edge of the ramus of the lower jaw, the mentus auditorius externus, and the mustoid process of the temporal bone. It extends vertically from the zygomatic arch to below the angle of the jaw. Its owler surface is broad, flat, oval, slightly convex, and having no precise limits, extends more or less upon the face. It is covered by some fibres of the platysma-myoldes, the skin, with a few nervous filaments. Its circumference is prolonged anteriorly over the masseter muscle, and superiorly over the articulation of the jaw. At the under part of this circumference, from which Steno's duct takes its rise, the branches of the facial nerve are seen emerging. The auterior surface corresponds above to the articulation of the lower jaw, externally to the posterior edge of the same bone, and internally to the pterygoideus internus muscle. It is moulded upon these different parts, and penetrates juto their intervals. Its posterior surface is connected by dense cellular tissue with the meetus auditorius externus, the mastoid proces, the anterior edge of the sterno-cleido-mastoideus, the posterior belly of the digastric muscle, the styloid process, and the muscles which arise from it. All these relations of the gland may be sufficiently exposed by a careful disser-tion of the edges of the gland. The internal carotid

artery, and internal jugular vein, touch its deepest surface. The external carotid artery, at its termination, and especially the superficial temporal artery, are also in connexion with this surface of the parotid gland. They are even generally enveloped by its parenchyma, aspecially the latter, which traverses it from below upwards; while the facial nerve, which is also placed in the gland during part of its course, passes transversely through it; but in order to see these two facts, the gland must be divided perpendicularly with the knife. to such a depth as to expose the facial nerve, the external carotid artery, and its accompanying vein, these lie. at a great depth in the gland, and near its posterior surface. The parotid gland furnishes, by each of the granulations of which it is composed, a very slender excretory duct, which unites with those in its vicinity, in the manner of veins, to form somewhat larger twigs, then branches, and lastly, a considerable trunk named the Parolid Duct or Steni's Duct, (ductus Stenosimus.) . This duct emerges from the fore and outer part of the gland, a little above the middle of the height of the masseter muscle, over which it proceeds herizontally, from behind forwards, to turn over its anterior edge. and sink into the adipose cellular tissue of the check, and beneath the zygomatic muscles. Having arrived upon the buccinator muscle, it passes through an aperture formed in the midst of its fibres, and terminates in the mouth, opposite the second molar tooth of the upper jaw, at the distance of about three lines from the meeting of the cheek with the corresponding gums. The duct does not pass through the buceinator obliquely, but perforates it perpendicularly, and forms an angle as it passes through the murous membrane of the mouth, proceeding a little forwards. Its prifice is besides very contracted, and furnished with a small fold of the mucous membrane, so that it is not easily perceived from the inside of the mouth. It very frequently receives, about the middle of its length, another duct from a glandular body placed in its vicinity, (socia pacotidis) which appears to be an accessory gland to the parentid. This budy is in fact placed before the masseter muscle, either above or beneath the duct, sometimes even in its course. Its surface is commonly amouther

than that of the gland itself. Its duct seems uniformly to join that of Steno, although the contrary has been asserted by some. The parotid duct is but loosely connected with the neighbouring parts. It is accompanied by several branches of the facial nerve, and by some arteries which furnish ramifications to its walls. Placed immediately under the skin, it is only separated from it internally by some fibres of the platysma-myoides, and by the zygomaticus major, which crosses its direction obliquely. It is about a line in diameter, but its cavity is very narrow. Its walls are composed of two distinct membraneous layers. The owler is firmstrong and thick, of a whitish colour, and fibro-cartilaginous appearance; it acquires still greater density towards the end of the duct, which, without increasing in capacity, becomes conical; and near the buccinator muscle it gives rise superficially to a thin aponeurosis which covers the fleshy fibres of that muscle, while it also gives attachment to some of its fibres as it passes into the aperture of which we have spoken above, and by which these fibres are actually interrupted and not merely separated. The other membraneous layer of the duct is internal; it is mucous, very delicate, and appears to be continuous with the membrane which lines the cheeks, differing from it only in whiteness-To expose this, the duct had better be opened about the middle with a pair of scissors, and a probe or bristle passed through the interior of the duet into the mouth. There are always found, in the substance of the parotid gland, a great number of branches of the facial nerve. the transverse artery of the face; the posterior nuricular artery, and the wein which forms a communication between the internal and external jugular vein. It thus receives the greater part of its vessels and nerves; but a branch of the inferior maxillary nerve and one of the ascending branches of the cervical plexus famish it with a few additional nerves. Its lymphatic vessels are numerous, and pass into the glands simuted at its surface or behind the angle of the jaw. Its parenchyma differs in nothing from that of the other salivary glands. observe the deep-seated connexion of the gland and its position to the deep arteries, styloid process, &c., the gland must be extensively out into and even partially raised up. As this necessitates the section of many nerves and vessels, the susdent must view them at this

stage of the dissection.

437. The Pourso Dura or motor division of the sewenth pair of Willis, and its connexion with the fifth pair and with the cervical nerves form the principal perves to be considered here. Immediately on leaving the foramen stylo-mastoideum, the facial nerve or portio dura gives off the posterior surricular branch, which is applied to the mastoid process and lodged in the groove between that process and the vaginal; it next gives off the stuloid branch to the stylo-hyuid muscle; a posterior martoid braxed to the posterior belly of the digastric muscle. The porto dura next divides into two great divisions, the temporo-facial and cervicu-facial. The first or superior of these proceeds from behind forward in the substance of the gland, crosses the neck of the condyle of the lower jaw receiving branches from the auriculo-temporal branch of the fifth or trifacial. This branch which comes from the inferior maxillary branch of the fifth, lies very deep close to the maytold process and behind the neck of the hone. The Temporo-facial division of the portio dura next subdivides into temporal, orbitar, sub-orbitar, and buscal branches which may be seen piercing the gland in varisus directions. The greater number of these nevers supply the muscles of the regions to which they proceed. The second or inferior division of the formal nerve, called the cervice-facial, follows the original direction of the nerve, proceeding, like the former from behind forwards in the substance of the gland as far as the angle of the jaw, where it subdivides into burral, mental and organal branches. These latter anastomose with the nervus superficialis or according rolli, a branch of the pervical plexus which may be seen crossing the mustoid muscle obliquely, and after penetrating the gland, unites with the facial. The older anatomists described a pleasur or per autorius formed by the portio dura whilst in the gland. The portio dura in its course forms not one but several plexuses.

438. The EXTERNAL CARRYIN ARTERY enters the gland at its inferior margin and close to its deep surface; in its ascent it is crossed by the partia dura. By

dividing the substance of the gland, the artery may be traced through it, becoming more and more superficial, until becoming the temporal it ascends over the superior horder or apex of the gland, pierces the fascia, and passes over the root of the zygoma, in front of the exturnal ear. In this course it gives off the posterior auxiculer, running between the mastaid process and auditory canal; the trunsversalis faciei which arises, however, most frequently form the temporal branch of the carotid. This branch follows the course of Steno's duct, being generally above it. Lastly, the external caronid, whilst still embedded in the gland, divides into ats terminal branches, viz. the internal maxillary and temporal. The internal maxillary passes inwards and forwards behind the ramps of the jaw, and a short way below the candyle. The anterior border of the gland must be drawn forcibly away from the paretid margin of the jaw, in order to expose a small portion of this artery. Lastly, the temporal artery follows the original direction of the external curotid, becomes subcutaneous soon after passing over the root of the avgoma. The wins corresponding to these arteries, follow their course, and are similarly named. The temporal and internal maxillary veins unite to form a single trunk in the substance of the gland, which, descending, leaves it inferiorly, and near the angle of the jaw subdivides into two hunches, (on the surface of the digastric mascle,) one proceeding to join the external jugular vein, the other, the internal jugular. The latter branch is usually the larger, but not constantly. To examine the deeper connexions of the carotisl, and thus he satisfied of the danger. If not impossibility of removing the whole of the gland, when schirrous, or offerfed with any disease requiring its extirpation, divide Stono's duct, and forcildy raise up the gland. It may now be perceived that it partially envelopes the stylesid process, touching the internal carntid artery and jugular vein, the glenoid cavity of the temporal bone, ligaments of the lower. jaw, and internal pterygoid muscles. Its intimate union with the external surface and anterior margin of the sterno-mastoid, has been already noticed. The student must next clean the masseter muscle.

439. MASSETER lies upon the outer surface of the

lower jaw, arising from the two anterior and outer thirds of the inferior calge of the zygomatic arch, from the posterior part of that edge, from the inner surface of the arch, and from the internal aponeurosis of the temporal muscle. These origins take place in a distinet manner; the first, by a very strong, broad, and thick aponeurosis, which covers the outer surface of the muscle to beyond its middle part, and is divided into several digitations which are interposed between its fleshy fibres; the second, by small aponeuratic hundles, which are much shorter; the third, by small fibrous planes of still less extent. The fleshy fibres which come from these three points follow different directions; the first, which constitutes the principal part of the muscle, pass obliquely downwards and hackwards, to be inserted at the outside of the angle of the lower jaw, by small aponeurotic lamino; the second descend vertically, and are attached a little higher; the third proceed obliquely downwards and forwards to terminate on the outside of the coronoid process by other aponeuroses. The external surface of this muscle is covered posteriorly by the parotid gland; below, by the platysma myoides; in the middle by Steno's duct, the facial nerve, and the transverse facial artery ; anteriorly and above, by the orbicularis palpebrarum and zygomaticus major. All the other parts of this surface are in contact with the skin. The internal surface covers the ramus of the jaw, the tenden of the temporal muscle, and the buccinator, from which it is separated by a great quantity of fat. The masseter raises the lower jaw, and acts much during mastication. The part of the lower jaw situated a short way below the condyle, is quite smooth, and has no attachment of any muscular fibres to it. Next clean the

440. Transporat Aronaumosts. This openewrosis is attached to the whole of the corved line formed by the external, frontal, temporal, and parietal crosts, to the posterior and superior edge of the malar bone, and to the upper edge of the 2ygo-matic arch. Thin, membranous, and of a violet tint, above where the muscular fibres may be seen shining through it, becoming thick and strong interiorly, where previous to its attachment to the zygo-matic arch, it separates into two very desse lamine.

between which will be found the middle temporal arteries, and in most young pursons, a collection of fat. This appropriate secures the temporal muscle in its place, and formishes an extensive origin for its fibres.

441. The Temporal Muscle may now be exposed fully by removing the temporal aponeurosis and dividing with a saw the zygomatic arch at two points, the first a little in front of the inferior maxillary articulation, so as to avoid cutting through the external lateral ligament; the second through the malar hone; by forcing up the part thus separated with a chisel, we remove the masseter along with the divided parties, exposing the temporal musele and several branches of the inferior maxillary nerve. These branches may be examined and preserved, or divided in such a way as to be afterwards recognized in the progress of the dissection. The Temporal Muscle is broad, triangular, thin above, narrow and thick below, filling the whole of the temporal The fleshy fibres take their origin from the inner surface of the aponeurosis and from the bones forming the temporal fosse, i. c. the parietal, frontal, temporal and sphenoid, as low down as a crest which separates the temporal from the xygomatic fossa. The fibres proceed obliquely to a tention occupying the centre of the muscle which gradually becoming more and more tendinous, is at last inserted into the coronoid process. of the inferior maxilla; it embraces this process nearly in its whole extent, excepting externally, into which a portion of the masseter is inserted. The external surface of the temporal muscle is covered by the enterunial apameurosis, the superior and anterior auricular muscles, orbicularis palpehearum and masseter, the superficial tempural vessels and nerves, and the zygomatic The jutersol surface is applied upon all the bones which form the temporal foon, the internal maxillary artery, the pterygoidens externus and buccinator muscles, from which it is separated by much fatapper edge of this muscle is curved; the asterior extends from the external arbitar process of the frontal hone, to the anterior edge of the commaid process of the lower iaw. The posterior edge, which is at first attached to the horizontal root of the aygomatic process, is reflected from above downwards over the base of that process,

to proceed to the posterior edge of the enrequed process. This muscle strongly raines the lower law, hower the oppor a little, and presses the tooth against each other. The posterior portion draws the jaw backwards, when it has been carried forward by the action of the exter-

nal pterygoid muscles.

The student may next proceed to the dissection of the pterygoid muscless. Saw through the coronoid process of the lower jaw obliquely at its base; cut the external laternal ligament, and opening the interior maxillary articulation, depress it cautiously. The neasester muscle may be entirely removed from the outer surface, of the romes after examining the masseleric branch of the fifth pair of nerves, and a portion of the broad surface of the runness of the jaw also removed with the saw or a pair of bone nippers; this, with a little obsaining, will expose the pterygoid muscles as far as they can be seen at this stage of the dissection.

442. The Printegotorys Extracts is short, situated in the zygomatic fossa. It has two origins, one from the outer surface of the pterygoid process and from the palatine tuberosity, the other from the lower part of the zygomato-temporal aspect of the sphenoid bone immediately beneath the upper edge of the spheno-maxillary fissore. These attachments are formed by apaneuroses; the internal maxillary artery often passes between them, in an interval filled with cellular tissue. From thence the muscle is directed outwards and backwards, becoming gradually thinner, and is inserted into a small fises at the autorior surface of the neck of the concepts of the jaw, and into the fore part of the circumference of the inter-articular filmo-partilage. Its nater auriger is in contact with the temporal muscle, and most commonly with the internal maxillary artery, The inner merface corresponds to the marygoidens inseenes, the interior maxillary nerve, the internal lateral ligament of the temporo-maxillary articulation, the middle meningeal artery, and sometimes the internal maxillary artery. The opper surface touches the upper part of the zygomatic foscs, and the deep temperal and magniferic nerves. The outer plorygold muscle draws bruand the montyle of the jew and the fibro-cartilage of the articulation, moving the chin in the opensite direction. When the two act together, the jaw is drawn directly forwards.

443. The PTERVGOIDEUS INTERNES is a strong and thick musels, situated internally of, and a little behind, the ramps of the inferior maxillary bone. It arises from the whole pterygoid fossa, and particularly from the inner surface of the outer wing of the pterygnid process, by distinct aponeurotic fibres. It descends backwards and outwards, after receiving fibresfrom the middle groove of the upper surface of the palatine tuberosity, and some others from the outside of the summit of the outer wing of the pterygoid process. It terminates on the inside of the angle of the jaw by aponeuroses, attached to the more or less prominent ridges that are observed in this place. Its inner surface covers, at its upper part, the circumflexus palati and constrictor pharyngis superior, and inferiorly the sub-maxillary gland. The outer exrface lies internally upon the branch of the lower jaw. much in the same manner as the masseter does externally. It is reparated from that hone above by an interval, in which are found the lingual and dentar nerves. the inferior dentar artery, and internal ligament of the tempero-maxillary articulation. When the two muscles act simultaneously, the jaw is raised and carried a little forwards; if smly one acts, it carries it a little obliquely toward the opposite side. When the lower jaw is fixed, they depress the upper. During the dissection of these muscles, the student must preserve as far as he can the internal maxillary artery and various branches of the inferior maxillary nerve; in the small triangular space between these muscles. this artery and vein will be found, likewise the dentar and lingual branches of the Inferior maxiflary.

44d. Vessets and Nerves or the Face. During the dissection of the muscles and other soft parts just described, the student will meet with the following urteress or at least with portions of them; viz. the faccial or external maxillary, the temporal and the internal or deep maxillary arteries. The student should trace the fascial artery from a little below the jaw to where it crosses the ramus immediately in from of the masseterie muscle, and from this point proceeding in rather a tortuous manner towards the commissure of the lips, and

oltimately to the root of the none and internal canthur of the eye where it anastomosis with some branches of the ophthalmic which arresy is a branch of the internal carotid. But onless the injection of the arteries has been a minute and suppressful one, this and other anastomoses cannot be seen. In the living person the facial artery may be felt as it crosses the ranges of the jaw, and may easily be compressed at this point during operations on the lips or mouth; the main trunk runs close to the mucous membrane of the month, but on its outer side, and may also be compressed at the angle of the mouth between the fingers of the surgeon. We shall afterwards consider that part of the facial artery which lies in the neek in connexion with the submaxillary gland and with the external carotid artery from which it comes. The branches sent off from the fascial, and which will have been met with in the course of this dissection, are the Labiglis Inferior, the Caronaria Inferior. ar, wassisterico, coronaria superior, navi lateralis, and angularis. These arteries are accompanied by corresponding years. The Fascial Vew itself in which they terminate, does not strictly accompany its corresponding artery, but is situated external to it at the distance generally of half an inch; on the ramus of the jaw, however, they closely approximate. The soin ultimately joins the external and internal jugulars. (449.) The external carotid artery as it passes through and behind the carotid will be afterwards described; likewise its termination in two branches, the temporal and interval maxillary arteries. The course of the arteria transversalis faciet may readily be traced. Should the student be disposed to follow the branches of these arteries at this stage of the dissection, he will find that the temporal gives off the following ; viz. unlermers meris, some very small branches to the fare part of the car; consularer to the joint of the inferior maxilla with the temporal hone; temporatis weekin penetrating the temporal aparenesses to ramify between its laming and upon the muscle; temporalis perterior to supply a portion of the scalp; temporolis automoalso supplying the scalp and forehead. This is the branch usually selected for arteriotomy. The internal maxillary artery in point of size, may be considered as the terminating branch of the external carotid. Its

enurse is behind the neck of the inferior maxillary bone, between that bone and the internal lateral ligament, afterwards in a tortunus resoner between the pterygoid muscles until it reaches the lottom of the sphenomaxillary fossa. All the branches of this artery cannot be traced at the stage of the dissection, but the more important may be noticed; and a knowledge of the bones, which during this and most dissections should be placed before the student, will enable him to judge accurately enough of the course of those he cannot at present follow. The branches come offnearly in the following order: Ar. weningen media, Ar. deutalis, Ar. plerygoidere, and temporalis profunda, Ar. masseteriore, Ar. buccules, Ar. marillares superior, Ar. infra orbitales, Ar. palatina descendens, Ar. sasulis. Veins accompany these arteries which lie mostly in exacous canals. If the cranium has been previously opened, the middle arisey of the dura milter may be seen between the hone and dura mater, and lying in those grooves which mark the cerebral surface of the cranial hones, particularly those of the parietal. When the dura mater is stripped from off the bone, the artery in most cases comes along with it, being in fact firmly imbedded upon its outer surface, the artery in some parts, however, rons along short osseous canals in the bone, and will of course be torn across in the separation of the dura mater from the bone, hence the danger in fractures in this situation. It is this artery which seems to nourish the cranium. The vein ocensionally accompanies the artery, but more generally is situated between the tables of the skull, in the diplore, bence the name wins of the diplose. The nerves met. with in the dissection of the face, are branches of the seventh and fifth pair of cerebral nerves, those of the seventh pair or partia dura, have already been carefully described inspeaking of the paretial, they proceed chiefly to the muscles of the face. The fifth pair of nerves shows itself on the face chiefly at three points. A branch of its first great division, the ophthalmic leaves the orbit by the supra orbitar notch, it proceeds to be distributed mostly to the upper eyelid and forehead. Another branch of the same division of the fifth pair leaves the orbit below the troubles or pulley for the superior oblique muscle of the eye, this comes from the name branes of the uphthalmic. Below the jevator labil auperiors, there passes out by the infea arbitar formula, the terminating branches of the second division of the fifth pair, which is also well named the superior muxillary, this spreads to the integuments of the upper lip and adjoining parts; the branches of this division of the fifth, form a remarkable plexus with the portio dors of the seventh pair. Lastly, by the forumen went there passes the terminating branch of the inferior maxillary nerve, a third great division of the fifth pair; this mental nerve sends its branches chicky to the integuments of the lower lip. In dissecting the pterygoid muscles, the student will have observed many important branches belonging to the inferior maxillary nerve, the gustatory, inferior dentar, buccal, &c., but it will be better for him to postpone the examination of these until he has

nearly completed the dissection of the neck.

445. Dissection of the Neck. The subject leaving been placed on its back, a single flat block is to be put beneath the shoulders. The face turned to the side opposite to which the dissection is to be made, and thus secured with banks, make an incision from the sympleysis of the chin to the membrane of the sternum, through the integuments only; a second incision along the line of the claviele, as far as the shoulder; and a third if the face has not been dissected, from the symphysis of the chin to the tork part of the mantold process of the temporal home, reflect the square flap of the integuments thus insulated with great caution, commencing the dissection at the angle near the manubrium of the sternum, and in doing so dissect the platysma-myoides. This dissection will expose the platysma-myoides fully, and that portion of the cervical facin which covers the frant of the neck above the maaubrium of the sternum, and a small portion of the aterno-mastoid muscle; helew the masteid process will also be seen a small portion of the pervical facin covering the upper part of the sterno-mustaid muscle. At this stage of the dissection, the student most make himself fally master of the position of all those parts which project, or may be felt in the middle plane of the muck between the sternum and ching first, there is the lugissura or upper margin of the manuforum; above this, a deep bollow, in which is situated the trachea; but this origin is only to be felt in this subjects; processing upwards laterally, the swellings of the thyroid body, if large; and mesially, may be felt the projecting edge of the cricoid cartilage, the crico-thereof ligament, the salient angle of the thyroid cartilage, the thyro-byoid ligament, and lastly, the hady of the hyoid bone; between this bone next the symplysis of the chin, there is a most important dissection, but no hard parts, the whole being filled up with numerous muscles. Having thus made himself master of the position of these organs, let the scudent again turn his attention to

446. The PLATYSMA-MYOTDES MUSCLE. This muscle has the appearance of a thin fleshy membrane extended over the lateral parts of the nock. It is of a square form, broader above and below than in the middle. Its fibres originate in the cellular tissue and thin aponeurosis which covers the upper part of the deltoides and pectoralis major, and sometimes even so far down as the fourth rils. At first spread out, they approximate and ascend obliquely inwards, the plane they form on the sides of the neck assuming some degree of thickness. The two muscles thus converge; at the middle of the base of the aw, they expand a second time. Their more anterior fibres are the longest and largest, intermingle beneath the symphysis of the chin, and terminate in the skin of that part. The middle fibres are fixed to the external oblique line of the lower jaw, and to the base of that hone. Several of them pass across those of the depressor anguli oris to be continued into the quadratus ments, or ascend to the commissure of the lins. The posterior are in part incorporated with the depressor anguli oris, and in part lost in the cellular tissue of the cheek. The latter sometimes ascend to the orbicularia palpebrarum, or direct themselves toward the car, covering the trapexius's little; but the last of them, which are much sharter than the rest, do not reach so far as the aw-bone. They are also frequently strengthened by a thin muscular plane, (Musculus rimeins of Santovini), which, arising before the parotid gland, or apopenrosis of the massater muscle, proceeds horizontally toward the angle of the mouth. The external surface

of the platysma-mynides is covered by the shin, from which it is separated by a dense collabor tissue containing in general little in. It depresses and corries outwards the commissures of the lips | lowers the whin of the check and that of the nock, which it wrinkles transversely, and ruises it into long projecting folds; assists in lowering the under juw | and may also raise the skin which covers the upper part of the chest. Divide the latissimus culli about the middle, and reflect it inwards its origin and insertion. This will expose the

447. CERVICAL FASCIA. This fascia, to which surgical writers since the time of Mr. Allen Burns, have devoted so great attention, is a firm layer of very condensed refjular substance, enveloping the muscles, vessels, nerves. and glands of the neck. It is usual to divide it into two, a superficial and a deep fascia, but this only serves to confuse the student, and is not a correct description of it. It is double merely where it encloses the musclas, and forms sheaths for the vessels and nerves, fullowing in its arrangement that of the aponeurosis of the extremities. Having cleaned its surface generally, and examined the course of the external jugular vein and nervus superficialis colli which lay imbedded in it, crossing the entrse of the sterno-mastoid muscle, proceed with the dissection of the fascia. Make an incision from the middle of the byoid bone to the sternum; a second from over the mustoid also to the sternum, along the line of the sterno-masteid muscle about the middle; raise up the flaps so made cautiously, and clean the surface of the muscles. This will show the student that the fascia in question is single, excepting where arriving at the edges of a mutcle, such, for example, as the sterno-mustaid, it divides into two, so as to enclose it. Thus the fascia furnishes shouths for the muscles. Next make an inestion from the symplaysis of the chin to the part where the cursus of the lingual bones unite with the middle portion; and a second from this point to the surface of the mustoid process; by reflecting the fascia along the line of these incisions, may now be seen from it furnishes a sheath for the amerior and posterior bellies of the digastric mescle; lastly, so incisen carried shownwards and inwards along the auterior margor of the sterno-mastoid muscle, will next display the shore

that the cervical fascia has in the formation of the shouth of the yearls. In the course of this descention the parts chiefly to be avoided are the veins which cross the posterior bolly of the digestric muscle, and the moreus descendens none which occasionally lies in or imbedded in the sheath of the grant vessels of the nock. Lauly, the student should make no incision below the base of the jaw, from near the angle to the symphysis, and reflecting the partion of the fascia which he thus divides, he will thereby expose the sub-maxillary gland, and he able also to examine it is vitu: it should not at this stage of the dissection be much disturbed from its position, since all that is required at present is merely to be convinced that it lies enclosed in a sheath of the cervical facia like so many other soft parts in the neck. We have now only to speak of the extent of the fascia towards other regions, and of the anatomy of the few parts requiring to be out through to enable the student to proceed with his dissection of the muscles. Superiorly, it expands over the parentid, adhering to the cartilaginous take of the ear and lower law; posteriorly and latterly in the direction of the trapezius, it degenerates into commou cellular membrane : inferiorly, it adheres to the inter-clavicular ligament posterior edge of the manufrium of the sternum and clavieles; behind the sternum it passes towards the chest; finally, it is known to be connected with the styloid process of the temporal bone, the stylo-maxillary figument and hyoid. Between the sterno mastold and anterior margin of the trapezion, it shuts in very carefully the space above the clavicle, and here covers many important parts. Proceed with the dissection of

448. The Sterno-clripo-mastoromis Muscle is long, flat, about two inches broad, narrower in the middle than at its extremities, bifurcated below, and situated obliquely upon the anterior and lateral parts of the neck. The two branches of its bifurcation are separated from each other by an interval filled with cellular tissue. The inner or anterior, which is thicker and narrower than the other, arises from the fore part of the manufrium of the sternum, by a tendon which ascends very high upon the fleshy filtres. The suter, which is sometimes divided into several portions.

arises by very distinct apprerarotic filters, from the inner and upper part of the claviele, over an extent which varies in different subjects. These two portious of the muscle follow different divertions: the first ascends obliquely backwards and outwards, and covers the second. which is nearly vertical. After thus crossing each other they remain for some time distinct, but are at length incorporated, so as to form a single bundle, terminated by a broad and thin aponeurosis posteriorly," where it is attached to the outside of the upper curved line of the occipital bone, narrow and thicker autoriorly, where it is inserted into the mustoid process. At the union of its two portions, or a little above it, the sterror-mastoidens is traversed abliquely by the spiral accessory nerve. A few of its fibres arise from the inside of the sheath this mustle receives from the ourical fasela. Its outer surface is covered in its whole extent by the cervical fascia and platysma-myoides, excepting at its upper part, where it lies under the skin and paratid gland. Between a and the playamamyoides are observed the external jugular very and some nervous filaments of the superficial pervical plexus and nervus superficialis colli. Its issuer aurface is applied throughout upon the sleep part of the shooth it derives from the cervical fascia, heneath which are placed inferiorly the sterne-clavicular articulation, the sterno-thyroldeus, sterno-hyrodeus, and omo-hyrodeus muscles, the internal jugular vein, the trank of the enratial artery, the pocumo-gustric nerve, the carviral plexus, and the sympathetic nerve. Above, it corresponds to the scalenus, levator auguli scapulæ, splenius, and digastrices muscles, and to the spinal accessory nerve. Its auterior or trachest edge is very close helow to the muscle of the opposite side, but widely separated above. Its upper and lower parts are pretty thick, but in the middle it is thin. The powerior edge is thin, and a little cancave, the anterior edge is con-This muscle corries the head forwards, inclines it to its awa side, and makes it perform a retadicy motion which turns the face to the opposite side. When the two muscles act together, the head is bent directly forwards.

449. EXTERNAL JOHULAN VIAM. At this stone

of the dissection, the student may examine partieulary the course of the external jugular vein, and nervus superficialis calli. The ceta commences gonerally by a doop branch, which it receives from the common trunk of the temporal and internal maxillary veins, and at first lies imbedded in the parotid; it also usually receives another branch from the faciat coin, and frequently numerous superficial veins join it from the fore part of the neck,-thus formed, it erosses the sterno-mastoid, descending outwards beneath the players mynides until just over the clavicle, where it penetrates deeply to join the subclavius or some of its branches. The veries experficialis colli is a pretty arrong nervous filament crossing the sternomastoid from without inwards, and from below upwards, it proceeds from the cervical pleases to join the fascial in the parotid. Previous to dividing the sternomustoid, let the anterior margin of the trapezins muscle be cleaned, next cut the sterno-mustoid about an inch above its sterno elevicular attachment, and reflecting it carefully, close the one-hyoidens (scapulo-hyoidens) musele.

450. The Oun-irrainans (Scapulo Hypideus), is a long, slouder, flattened, and narrow muscle, situated abliquely on the sides and fore part of the neck. It arises below, by aponeurotic films, longer before than behind, from the upper edge of the scapula, behind the cornecid notels, and often from the ligament which converts the latter into a hole. It ascends forwards and inwards, becoming narrower passes behind the claviele, some times attaching itself to its posterior edge, crosses the direction of the sterno-mastoideus, and is here converted into a thin and carrow tendon, of variable length, and form more distinct before than behind. It then becomes fleshy again, increases its breadth, and ascends nearly parallel to the sterno byosileus, to terminate by very short aponeuroses on the sides of the lower edge of the body of the byoid bone. It is thus a digastrie muscle. Its outer surface is covered by the trapexius, platysma-myoides, sterno-masmidens, and the elaviele. The issur corresponds to the two scalent, the anterior branches of the inferior cerrical nerves, the trunk of the earotid artery, the internal jugular voin, the superior thyroid vessels, and the sterno-byoidens and sternothyroidens muscles. This muscle lowers the hyoid bone, carrying it a little backwards and to a side. When it acts along with its fellow, it howers the bone directly and carries it backwards. It is much used by some persons whilst sponking. The interior extremity of this muscle cannot be exposed until the clavicle has been removed, and the unterior part of the trapexis-

cut through.

451. The STERNO-BYGERES is placed at the fore part of the neck, arises behind the clavicular extremity of the sternum, from the posterior sterno-clavicular ligament, and also appartimes from the cartilage of the first rib. Its origin, therefore cannot be seen at this stage of the dissection. It ascends obliquely inwards, contracting a little, and approaching that of the opposite side, as far as the middle of the larynx. It then directs itself a little outwards, and terminates at the lower edge of the body of the hypid bone, internally of the preceding muscle to which it adheres very closely. It commonly presents, at a variable height, an aponeurotic intersection more visible before than behind, somewhat tortuous, and often only existing on the inside. The auterior surface of this muscle is covered by the claviele, the sterno-mastoidem, platysma myoides, and omo-hyoideus muscles, and by the skin. The purterior is applied upon the sterno-thyrnideus, crico-thyroidens and there-byodens muscles, the there-byoid membrase, the thyroid body, and the superior thyroid vessels. A small synovial bursa exists between it and the crico-thyroid membrane. It depresses the hyoid hane, and consequently the larynx, and thus furnishes a fixed point to the depressor muscles of the jaw. Cut this muscle through about the middle, and reflecting its portions towards their attachments, clean the

452. Streaso transcrutes. This muscle arises from
the upper part of the internal surface of the sternum,
opposite the cartilage of the second rib, whence it usconds, directing itself a little outwards, and someracting, to the thyroid cartilage, on the oblique ridge of
which it terminates by short openeurous. It also
sometimes presents at its lower part, an oblique or
transverse appropriate interception. Its outerior our-

face is cavered by the starno-hydideus, sterno-mastoideus, and omo-hydideus muscles. The posterior covers the subclavian and internal jugular veins, the trunk of the carstid artery, the trachen, the thyroid body and its vessels, the crico-thyroideus muscle, and a part of the constrictor pharyngis inferior. It acts upon the thyroid cartilage in the same manuer as the preseding muscle upon the hydid bone. Cut through the sternothyroideus, reflect its portious, and thus expose the

453. Thyro-involuers. It is of a quadrilateral form, shore and thin, situated at the middle and fore part of the neck upon the larynx. It is often continuous with the preceding by its lower edge, which is attached to the oblique ridge of the thyroid cartilage, and consequently inclined downwards and inwards. It ascends from thence parallel to the murdle of the opposite side, and terminates at the lower edge of the bady of the hyoid bone, and at the anterior half of the outer edge of its great horn. Its asterior surface is covered by the sterno-hyoideas, ome-myoideas, and platysma-myoides. The posterior his upon the thyroid cartilage and the thyro-byoid membrane. Its use is to bring the larynx and hyoid bone toward each other.

454. Curco-ruysordaus. This small muscle is generally examined along with the intrinsic muscles of the larnyx, but practically it ought to be examined at this stage of the dissection, and we shall afterwards again refer to it when describing the larynx. The muscle is short and triangular, arising from the forepart of the criccoid cartilage, and according obliquely, is inserted broad into the lower border of the thyroid eartilage; by thus diverging from the muscle of the opposite side, it leaves a triangular space between them, in which will be found the crico-thyroid bigament. Its use is to approximate the two cartilages of the larynx to which it is attached.

455. Levator Glandule Thyrodule. This muscle, which, properly speaking, belongs to the thyroid body, arises from the condensed cellular tissue investing that budy; it is of a pyramidal shape, and ascending, is inserted into the body of the bysid book, often narrow, or even not to be distinctly made out; it is never strictly menial in its course, and is remarkable in being an axygos muscle. In its ascent is lies upon

the thyroid eartilage. Next elean

456, The Digarran Muscus or Risenter Maxillo-Thick and fleshy at its extremities, alundar and toudsmmer at the middle, where it is bent upon stalf. It arises posteriarly, by appropuratio fibres, from the may toidal groom of the temperal bone, and descenda abliquely inwards and forwards, at first broader and thicker, but becoming gradually thinner, and changing into a strong rounded tendon, about two inches long. which passes through the lower part of the style-liveldens, but sometimes merely behind it. At the hyoid hone it is received into a kind of aponeuratic ring. which is attached to its upper edge, and furnished intereally with a small synovial burso, a line or two in brealth and of variable length. Then a bread and thin aponeurosis is detached from the lower edge of the tendon, which here changes its direction, and is bent upon itself. It descends before the mylo-hyoideus, contracts firm adhesions to it, and is also attached to the body of the levoid bone. The muscle then asomils forwards and inwards toward the base of the jaw, becomes a second time fleshy and thick, approaches that of the opposite side, and is insected into a forsa situated upon the sides of the symphysis of the chin, by aponeurotic filors; which are sometimes interlaged with those of the other procede. Its external surface is covered posteriorly by the trachelo-mostoideus, splenine and sterno-mastridens; in the middle, by the maxillary gland, which is lodged in the angle formed by the tendon ; anteriorly, by the platysms-myoides. Its inner surface lies upon the stylo-hypidens, stylo-glossus. any stylo-pharyngeus muscles, the external and internal carotid, the labial and lingual arreries, the internal jugular vein, the hypo-glossal nerve, the hypo-glossus and mylo-hyoideus muscles. This muscle depresses the under law, or raises the as hyoldes and parries it forward. Its posterior portion appears to assist in raising the upper jaw, by acting upon the skull,

457. Syvio-Hyotonia, long and slender, placed at the upper and lateral part of the neck. An aponeuroin prolonged upon the fleshy fibres, attaches it to the styloid process, near its base, and is separated from the latter by a small syngvial bursa. It descends thence invacels and forwards, following the direction of the posterior bully of the digastricus; it becomes broader, and then generally hifurcates, in a more or less distinct manner, to give passage to the tendon of that muscle. Uniting its two portions again, it is inseried at the lower part, and on the sides of the budy of the hyoid lume, by short aponeuratic fibres. Its unter mefore is covered by the digastric muscle. The lawer is in relation with the external carotid, the labial and lingual arteries, the internal jugular vein, the stylo-gloseus, stylo-pharyogeus, and hyo-gloseus muscles, and the hypo-glossal nerve. It raises the hyoid hous, and consequently the laryns, carrying it at the same time backwards and to a side. When the two muscles act together, the hyoid bone is mised directly and carried backwards. The style-byold ligament runs in the direction of this muscle, and is sometimes ligamentous, sometimes assenus, or cartilaginous; or even muscular. Detach the anterior belly of the digastric from the symphysis of the chin, and clean the

458. Myno-Hymneus, broad, thin, flat, and of a triangular form; arises, by short aponeuroses, from the internal oblique line of the inferior maxillary bone, between the last molar tooth and the mental process. Its anterior fibres, which are short, proceed obliquely downwards and inwards, and are incorporated with these of the opposite muscle, along a tendinous rophe, which descends from the symplexis of the chin to the Irvoid hone, and degenerates below into a thin appaneurness united to that of the digastric madele. The other fibres, which become longer the farther back they are situated, are less and less oblique, so as ultimately to become penrly vertical; they terminate by appreniones, at the lower and fere part of the body of the byold bone. The outer sweface of the mylahynideus, which inclines downwards and forwards, is covered by the digastrieus and platysma-myoides, and by the sub-maxillary gland. The inner covers the genin-hynhluus, genio-glossus, and byo-glossus muscles, the sub-lingual gland, the duct of the sub-maxillary gland, the prolongation of it, and the lingual nerve. It raises the hyold bone and carries it forward, or depresses the lower law, Detach the mylo-hyoidens, by entting through its attachment to the lower jaw, and also separate it from its fellow of the opposite side, by an Incision carried from the symphysis of the chin to the hyoid bone. In doing so, the student neast be cautious not to detach the sub-maxiliary pland from its connections, and he must be careful to leave the duct of that gland, together with the gustatory nerve, which he will find above the myla-hyoidens

muscle. Next clean the

459. GENTO-HYOTDEUS, thin, short, flat, narrower above than below. It arises from a small tendon inserted into the lower genial process, and descends backwards to be attached to the middle of the anterior surface of the body of the os hyoldes. Its unleries surface, which is inclined downwards, is covered by the mylo-hyoidens; the pasterior is applied upon the genio-glossus and hyp-glossus. Its inner edge is comtiguous to that of the opposite side, and often incorporated with it. The action of this muscle is to raise the hyoid hone, carrying it forward, or to depress the jaw. Detach the genio-hyoid from the symphysis of the chin, and reflect it towards its hyoid attachment The student must now, with a saw, divide the inferior maxilla at two points, first, in front of the massater muscle; secondly, at the distance of scarcely half an inch from the symphysis; take away the insulated portion of the jaw, leaving all the soft parts, by stripping the bone from off its periosteum. Lastly, draw the apex of the tongue out of the mouth, fix it thus prolonged with books, and proceed to examine the stylo-glossus muscle-

460. STYLO-GLOSSUS. To display this muscle, perhaps it is best to detach the stylo-hyoideus and digastrious from the hyoid bones, and reflect them ; but they must not be out away, but preserved in order to be replaced, when examining the course of the great arteries. The external carotid artery separates the stylo-hynideus from the stylo-glassus and stylo-pharyngens. The style-glossus is narrow above, broad and thin below, and arise chiefly from the style-maxillary ligament, which seems peculiarly intended for it. It is in fact attached to nearly the whole anterior edge

of that ligament and lower half of the styloid process, near its spex, by a thin aponeurosis. It then expands, and descends forwards and inwards, to be partly lost upon the edge of the tongue, and partly continued into the lingualis, hyo-glossus and genin-glossus muscles, after being divided into two and sometimes into threebundles. Its outer curface is covered by the digastric muscle, the lingual nerve, the sub-maxillary gland, and the numerous membrane of the month. The inner covers posteriorly the constrictor pharyngis superior, hyo-glosus and lingualis. The style-glossus carries the tongue upwards, backwards, and to a side, when it acts alone; but when it contracts at the same time with the other, the tongue is carried directly upwards and backwards. By using great caution, the student may at this stage of the dissection, and without cutting

away any important parts, dissect the

461. STYLO-PHARYNURUS, narrow above, broad and flat below, and of an elongated form. It is situated on the side and back part of the plarynx. It arises by short aponeurotic fibres, from the inner part of the styloid process of the temporal bone, near its base, and descends inwards and backwards towards the pharynx, passes under the constructor medius, and between it and the superior expands, confounds the greater part of its fibres with those of the other muscles of this region, and sends some to the thyroid cartilage and hyold bone. Its nuter surface is covered by the stylohyoidens, constrictor pharyngis medius, and external carntid artery. The macr is in connexion with the internal carotid artery, the internal jugular vein, the membrane of the pharynx, and the constrictor superior and palato-pharyngaeus muscles. This muscle shortens the pharynx by raising its lower part. It also raises the laryns. Next examine the hyp-glossus, taking care, during the course of the whole of this dissection, to out away no important artery, nerve, or vein which may occur, more especially if this be the second time that the student is examining the bend and neck; but if it be his first dissection of the parts, he neght not to pay much attention to the smaller vessels and nerves.

462. The Hyp-Grouns is this broad, and square-

hyoides. The first (ceruta-glustres) is attached by short aponeurotic fibres to the upper surface of the great lors of the hyuid bone. It ascends a little obliquely from behind forwards, contracting in its progious, toward the lover and lateral part of the tangue, where it is continuous with a portion of the fibres of the style-glosses, after having passed between its two bumbles, and finally terminates in the dermis of the mucous membrane. The second portion (hazin-gluenes) which is not so bread but thicker, covers the preceding portion a little at its upper part, and is separated from it below by the lingual arrery; it arises from the upper part of the anterior surface of the budy of the hyund benn, and ascends a little obliquely backwards and outwards. Lastly, the third portion (choodre-glacom) originates from the small harm of the same home, as well as the cartilage placed between the hody and the large horn, and ascends upon the sides of the root of the tungue, where it is confounded, like the lineinglassus, with the lingualis and genio-glossus, without our being able to trace it to the tegumentary menibrane. The outer revious of this muscle is covered above by the style-glossus, with which it is connected: a little farther down, by the mylo-bynideus, the great hypo-glossal nerve and sub-maxillary gland; and still farther down, by the genin-bynidens, style-hynidess and digastricus. The issuer surface is in connexion with the constructor pharyngis medius and genio-glosous museles, the lingual artery, and the glosse-planyngeal perve. Thus the muscle separates the lingual artery from the hypo-glossal nerve. The hyp-glossus lowers the base of the tongue, or raises the hyuid bone when the tongue is fixed. When it acts on one side only, it inclines the tongue towards the same side.

463. Granu-Hyn-Grosses. The tongue must be elongated, drawn well out of the mouth, and fixed with hooks, and the sublingual gland and massess membrane of the mouth detached from their connection with the inside of the symphysis of the jaw and lower surface of the apex of the tongue; by this means only can the whole of this very difficult must be exposed. The genin-glacus is a triangular radiated tunsels, transversely flattened, and situated between the tongue and lower maxillary

bone. It arises from the upper tulorols of the genial process, by a small but very strong short tember. which is more prolonged externally than internally, and from which proposed the ficely filters, diverging and following different directions, but almost always perpendicularly to the axis of the tongue, The opper fibres, which are the shortest, are at first hurizontal, but on arriving at the lower part of the tongue, mirve upwards and focwards to reach its point. The middle fibres, which are less curred, are confounded on the side with the lingualis muscle. The inferior are much longer, and descend obliquely backwards to lose themselves at the base of the tongue, or even to be attached in part to the summit of the small horn of the or hyoldes, or continued into the constrictor pharyngis medius. There results from this arrangement that the muscle represents a triangle whose base is attached to the tongue, where its fibres are interlared with those of the lingualis, style-glassus, constrictor pharyogis superior, constrictor medius, and hyp-glossus. At the place where the two geniu-giossi touch each other behind, there is observed a small bundle of fibres, which ascends towards the middle ligament of the epiglottis, to be inserted at the dorsal surface of that organ. The external surface of the genio-glossus is covered by the sublingual gland, and the stylo-glossus, hyo-glossus, lingualis, and mylo-hynideus muscles. Its isner surface is in contact with that of the opposite side, and eyen incorporated with it below and behind. Its lower edge corresponds to the geniu-hypideus; the space, to the murous membrane of the mouth. The contraction of the inferior fibres of this muscle carries the tongue and hyoid home forwards, after having previously mised the latter. The superior fibres pull it backwards, and restore it to its natural position; while the middle sycory a othi positive larrab str wollow syrdiff

464. The Proposition Lindblad, or Lindblad Muscum is a small irregular bundle, entirely compassed of fleshy fibres, lying under the sides of the tongue, between the byo glosses and stylo-glosses, which are on the outside, and the genio-glosses, which is within. It is chargeted, thicker posteriorly than anteriorly, and incorporated in its lateral parts with the muscles just mentioned. Its posterior extremity loses itself in the base of the tongue; the anterior is prolonged as far as the tip of that organ. Its inferior anchine is lined unteriorly by the mucaus membrane of the mouth. The apper, confounded with the fiestly and complicated texture of the tongue. It shortens the tongue, and

depresses its mint.

165. Granust an Bonres met with during this dissection. I' A very considerable number of lymphatic glands lie scattered over this dissection (a chain of these glands will be found beneath the tracheal marginof the sterno-mastoid muscle; another chain of glands run beneath the posterior margin of the same musele; a number of insulated glands between the sternomastoid and trapezins, a little above the clavicle, and a few deeper, close to the great blood vessels; some may also be observed behind the sterno-thyroideus muscle, and at the sides of the trachea and gullet: one or two lie upon, or are imbedded in the paretid and sub-maxillary glands; likewise, over the edge of the base of the jury, and just below and within the symplesis of the chin. All these glands are small in healthy persons, but become enlarged in constitutional disease. The lymphatic ressels which pass through them are usually descending from above downwards. The student may now detach the superior attachment of the ome-byosileus muscle to the body of the byoid, clean more fully the thyroid body than he has hitherto done, thus obtaining a view of it on both sides.

466. The Trymon Boor (Glandala Thyroidea), is an organ respecting the uses of which we are totally ignorant, and which anatomists usually describe after the larynx, on account of its situation; for it covers the lower and autories parts of that organ, as well as the first rings of the trachen. This body exhibits great differences as its size in different individuals, and at different ages in the same individual, without our being able to assign any reasons for them; but, in general, it is larger in the child then in the adult, and in the female than in the male. It is more constant in its form; is romposed of two oval lobes, flattened from before backwards, thicked below than above, and having a more or less oblique direction in different individuals.

These two lobes are sometimes united in a great part of their extent; but in general are separated, and only connected with each other by a transverse cord, more or less broad and thick, named the Inthones or Middle Loke of the Thyrord Gland ; from this middle lobe there ascends not unfrequently a narrow purtion, called the Paramidal Lebe, this ascends upwards on the surface of the thyroid cartilage, following the course of the muscle maned the Lemme Glandule Thyroider (455.) This labe is rarely wanting, and varies in almost every subject, nor does it ever ascend as high as the laryns. The anterior surface of the thyroid body, is covered in the middle by the sterno-thyrolder muscles, and on the sides by the latissimi calli, omo hyoidei, and sterno-cleido-mastoidei. Its posterior surface, which is concave, is connected by a filamentous cellular tionse with the largux and the first rings of the traches. It also covers the crico-thyrolder, thyro-hyoider, and constructores pharyagis inferiores. Its posterior and lateral edger rost upon the trunks of the carotid arteries, the internal jugular veins, the pocume-gastric and recurrent nerves, the communicating cords of the cerviral ganglia, and that of the left sale only, on the esophagus. The superior thyroid arteries run along its upper rifer, which is deeply notched in the middle. The lower edge, which is convex, is in like manner accompanied by arteries, and gives rise to large roins. The upper extremities of its lateral lobes are lodged between the thyroid eartilage and the trunks of the carotid actories; the lower, between these arteries and the traches. The thyroid body is not contained in any membrane. The cellular tissue by which it is immediately surrounded seems alone to supply it with an envelope, which is somewhat dense and never contains fat. The proper tissue of the thyroid body is soft and spongy. Its arteries come from the external earotid and subclavian actories; frequently the arch of the aurta sends a separate branch to it. Its veins are numerous, and accompany the arteries, or issue from its lower edge. Its surves come from the paenmo-gastric nerves and sympathetic. Its lymphatics lose themsolves in the jugular glands. It is this body or gland, which, becoming enlarged, foran the brouchocele, one of the symptoms of goitre. The number of large vessels proceeding to it, whilst they seem to warrant a conclusion in organd to its physiological use in the system, contribute to render its extirpation in disease a hazardous operation. Bronchoecle is more frequent in Britain than has been supposed, and abounds particularly in Nowark and Wolverhampton in England, and in

some parts of Roxborghahire in Scotland.

467. The SUB-MANILLARY GLAND is situated at the inner side of the ramus and body of the inferior maxillary bone, and partly in the sub-maxillary fossa, in the triangular space which the two bellies of the digastrie musele leave between them. Irregularly nonidal and flattened on three surfaces, frequently bifurcated at its fore part, it is prolonged externally as far as the angle of the jaw, sometimes touching in this direction with the parotid gland. Internally, the superfloid portion of its anterior extremity advances towards the digastric muscle, and the deep portion, which is engaged behind the mylo-hyoideus muscle, tourhes the sublingual gland. In the same direction, it is separated from its fellow by the anterior bellies of the digastric muscles and the genio-hyoiden. Anteriorly, it is covered by the inferior maxillary bone, and preserve, is in connexion with the lingual nerve, the style-plasses and hyo-glosus muscles, and the facial artery, which it embraces. Inferiorly, it rests upon the platy ama-myoldes and the integuments. Superiorly, it is prolonged more or less between the pterygoideus internus and mylaleveldeus. It is moreover surrounded by a pretty considerable, although variable number of lymphotic glands. The exerctory duct of the sub-maxillary gland is named Wharlow's Dact. It is smaller than Steno's duct, and has much thinner walls, which are transparent and more elastic. Arising in the same manner by very slemler radicles in the labules of the gland, it issues from its deepest portion, passes between the mylo-hyalideus and hyo-glosous muscles, and proceeds nearly horizontally from without inwards, and a little forwards, between the genio-glooms and the sub-lingual gland, from which it often repeires several exerctory ducts. When it has arrived upon the side of the frenum lingue, it places itself beneath the mucous memhyane of the mouth, and terminates in this place by a very narraw orifice, siteated in the middle of a slightly prominent tuberels. It is accompanied, in its whole extent, by the lingual nerve, and lined in its interior by a prolongation of the mucous membrane of the mouth purhaps it is entirely farmed by the latter. To display the course of the duct properly, open it with the seissers near its origin in the plant, introducing a strong bristle into its interior, and passing it towards the mouth,-this will generally succeed in displaying its whole course. The arteries of the sub-musillary gland are numerous, but of small size. They are formished by the trunk of the facial and the branches of the lingual arteries. Its veins correspond exactly to the america. Its nerves come from the lingual nerve, the mylo-hyoid branch of the inferior dentar nerve, and the sub-maxil-

lary gauglion.

468. The Sublingual Gland is placed in the substance of the inferior wall of the mouth, under the fore part of the tongue, and seems in general to be exceely a sort of appendage to the sub-maxillary gland. Its position is nearly burizantal, and its direction parallel to that of the opposite side. It is smaller than the submaxillary gland, of an oblong form, with its greatest diameter from behind forwards, transversely flattenest, and ararly of the shape of an almond. It rests upon the mylo-hyoideus muscle, which separates it from the preceding gland, and is covered by the mucous membrane of the mouth, beneath which it forms a prominence. It is, moreover, in connexion internally, with the geniu-glosses muscle; asteriorly, with the body of the jaw ; pasteriorly, with the deepest extremity of the sub-maxillary gland, with which it often appears confounded between the hyp-glusus and mylo-by-sidous muscles. This gland has several exerctory duets, whose disposition is liable to much variation. They are always very slender. Six or eight proceed from its upper part to open upon the odes of the framum lingue, while five or six others usue from its lateral parts, and perforate singly the murues membrane of the floor of the month. Two, thron, or even a greater number, are also seen to end in the sub-maxillary duct; those latter are short, and frequently unite into a single truck before terminating. All these ducts appear to have the same structure as that of the sub-maxiflary gland, and like it are thin and transparent. The arteries of the sublingual glands come from the facial and sublingual; their nerves are furnished by the lingual and

hypoglossal

469. Scaler Mescles. Although it he usual and proper for systematic writers to consider these muscles along with the deep muscles of the neck, practically they ought first to be dissected and examined at this stage of the dissection, otherwise it is impossible for the student to understand the relative anatomy of the subclavian artery, vein, and axillary plexus, all which parts he will find, and must dissect in the lower part of the neck. There are usually, but not always three scaleri, often but two, and sometimes as many as four. We shall speak of them as three, viz. anticus, medias

posticus,

470. SCALENUS ANTICUS. In cleaning this muscle, great care must be taken not to cut away the plannic nerve which lies upon it, also the subclavian vein, ascending superficial artery, and sometimes two or three more vessels which cross it. Simple and broader below, narrow and divided into several portions above, situated upon the lateral and inferior pan of the neck. It is attached by a tendon which expands over the firshy fibres, to the outer surface and upper edge of the first rib, toward the middle of its length, and ascends a little obliquely inwards and backwards. dividing immediately into four fleshy tongues consreled by their neighbouring edges, and giving rise to as many small tendons, the upper of which are most distinct. Each of them is inserted, by means of those tendons, into the anterior tubercle of one of the transverse processes of the neck, from the third to the sixth inclusive. The onterior side of this murgle is covered below by the subclavian vein; higher up, by the trans-

[•] The only reason I can using for the compilers of certain manuals of artaining not describing the scalest in this place, is might to be, is, that their nathors have capied verifating not merely the description of M. Cloquet, but oven the systematic arrangements of that extellent writer, forgotting that in a manual the student leads for a practical and out a systematic arrangement.

verse and ascending pervical arteries, the pirenic nerve, and the omo-hyoideas and sterm-mastoideas muscles. Its peateriar side forms with the next muscle a triangular space, broad below, contracted above, in which are lodged, inferiorly, the subclavian artery, and superiorly, the branches of the cervical nerves, which form the brachial plexus. Its lower side is separated from the longus colli by the vertebral artery and veins. This muscle heads the cervical portion of the spine laterally and forwards. It also assists in inspiration,

by mising the first rib.

471. Scanence Mentus, longer and larger than the preceding, but of the same form, and placed farther back, the scalenge postions arises below from the outer surface of the first rib, from a rough impression which is observed behind the passage of the subclavian artery. and occasionally from the upper edge of the second rib. These two origins take place by sponeurotic fileres, which are prolonged to a great distance among the fleshy fibres. The second origin is sometimes wanting, and is always smaller than the first. The musels which is here separated into two distinct bundies, soon unites, although it is sometimes separated in its whole length, ascends a little obliquely inwards and forwards, and terminates by six small tendons, of a high the superior are the langest, on the posterior tubercles of the last six transverse processes of the neck. It is observed, in some cases, that a small hundle proceeds from the portion attached to the axis to ascend to the transverse: process of the atlas. The anterior side of the scalenus posticus corresponds to the preceding muscle, from which it is separated below by the subclavian artery, and above by the anterior branches of the cervical nerves. The posterow side, which is very narrow, is in connexion with the sacro-lumbalis, trunsversalis coli, splenius, and levator anguli scapula. The tamer covers the first external intercostal muscle at its lower part, and at the upper, the summits of the last six transverse processes of the neck, and between them the posserior intertransversalis muscles. Lastly, the outer side, which is broad below, and narrow above, is covered by the serratus magnus below; in the middle, by the transverse corrical artery, the skin, a great number of lymphatic glands, and nervous filuments of the corrient plexas; at its upper part, by the stermmasticalone number. This mosele has the same over at the avalence antique, but draws the certebral column a little backwords. There is usually behind this muscle, a much smaller que, the

the opposed to of the second rile, behind the preceding manely, and recording spreads and inwards, is inserted into the posterior subscribe of the transverse processes of two or three of the lower cervical vertebras. In me

it is emplor to the other scalent.

A7A. VPARILLA AND NARVES OF THE NECK. WO shall suppose that the student has made himself wall assumented with the preceding history of the muscles, by devocing one side of the head and much to their ab most exclusive consideration, and that having re-dissected and expelally cleaned all the muscles, preserving the arteries and perven in a second dissection, he is new prepared to consider the anatomy of these important paris. The nerves should perhaps be examined first. They are derived chiefly from three sources. viz. granial, spinal, and sympathetic. To the first belong those branches of the fifth he will meet with shering the desection of the neck; likewise of the righth and aloth. Of the spinal nerves, he will meet with the anterior branches of all the cervico-spinal and of the first pair of dono spinol nerves. Lastly, the cerrical portion of the great sympathetic system of nerves. (9) the fifth pair of evanial never: The dissection of the numerous and important branches of this nerve met with during the dissection of the laws and neck, will he last examined at a later period of the discottion. The only one we shall notice here is the arryus finqualis or quatatorius. This large branch comes from the inferior mexillary division of the fifth pair, and reorigin its usual scame of guetatorius from its supposed function of bestowing the sense of tasts on the macous surface and papille of the torque, to which it is mainly distributed-a function, however, which has been largly (Espated, The nerve will be probably liest met with on railing through the mylu-hyuidana murcle, running paralled to the style-glower mesole, socompanying the

duct of the submaxillary gland, and ustimately running between the sublingual gland and the mucous membrane of the month. If the nerve be traced eactionsly larkwards, a branch will be found joining its inferior margin, and ouming from the fissure of Glasser in the temporal hone. This nerve is the corda tomponi. It is supposed to continue downwards along the inferior margin of the gustatorius, (from which, however, it counset he properly distinguished) and to leave it after a short course, together with some other filaments from the unterior part of the nerve, then proceed to a small gauglion close to the submaxillary gland, (the submit-Many ganginos,) and from this several branches proceed to the gland itself. Whilst discotting the ptorygoid murele, the student will have met with many other branches of the inferior mexillary division of the fifth pair of nerves, but the consideration of these should be deferred until the dissection be farther myaneral. The eighth pair of Willis (glo-su-plaryugent, morves vagus and spinal accessory of most anatomosts) leave the cranium by the foramen locorum pasterius, along with the jugular vein which is behind it. Its minute anatomy, whilst passing through the granuou, will be slescribed afterwards. The anterior division of the narve, or the glown-plucyngeal, is generally first met with upon or chan to the style pharyagens muscle. It may be traced to the tongue and pharyus. The second disvision, via mercus vagus, descends along the neck in the sheath of the remels, between and behind the comanon caratid actory, and internal jugalar vein. The array is in the trached side of the nerve. The nerve should be traced as high as its connection with the superior cervical ganglion of the sympathetic, and downwards until it passes into the thorax. Its course through the thorax and into the abdomen, have been already carefully described. As these nerves are passing from the neck into the thorax, they are situated between the subclaven arrery and voice, the velo being in front of them. On their inner able is the common careful, and externally the internal jugular voice but more spart from each other than higher up. In its course through the neck, the nervus vague gives of the following branches proceeding from above downwards, one-

municating branches to the lingual and superior cervical ganglion, also some to join the hypn-gloreal ; planryngeal branch which had better he examined afterwards; superior laryogeal branch, arising very high, and sloping much downwards in its course to the larynx, passing behind the great vessels, and readily met with previous to its emering the larynx, between the middle and inferior constrictor muscles of the pharynx. Lastly, the nervus vagus gives off, whilst in the neck, some cardine branches to join the cardine plexus of the sympathetic. A branch of the nervus vagus is met with in the neck, which arises from it much lower down, and whilst the main trank may be considered as in the thorax; this is the inferior laryngeal nerve or recurrent. These nerves (one on each side) the recurrent, so remarkable for their course, and for the numerous experiments made on them, arise differently on the two sides. The recurrent on the right side comes off from the nervus vagus whilst crossing in front of the subclavian artery, it passes backwards behind the artery, and reaches the sides of the guilet and traches, lying embedded in much cellular substance: it may be traced readily to the lower and back parts. of the larynx. That on the left side comes off much lower down, whilst the artery is passing in front of the acrts, around which, to the left of the ligamentum arteriosum, the nerve passes. From this point upwards, it follows a course similar in most respects to that of the right side, but considerably longer. The third division of the eighth, on leaving the nervus vages at the have of the cramium, passes behind the internal juguing vein to reach the deep surface of the upper part of the sterno-mustoid musele; it perforates this musele after supplying it with branches, and is ultimately distributed to the trapezius muscle. A large purfinu, however, of this nerve, enters into the composition of the superior laryngeal nerve. The hypoglemal nerves leave the eranium by the anterior condulaid foramina; and are united to the outer side of the pneumo-gastric. by collular tissue, and sametimes by a nervous filaamont: descond forwards, becoming superficial, placed around to two branches of the carutid arrery, the posqnon-pastric nerve, and the superior cervical ganglion,

and covered by the stylo-hyoidous and digastrious muscles, the occipital artery, and the internal jugular vein. There, it communicates, by one or two filaments, with the nervous arch which the first and second versical across form around the transverse process of the atlas. It then appears between the branches of the internal jugular vein, and immediately under the sterno-cledde-mastoideus muscle. At the augle of the jaw. it changes its direction, bends under the middle tember of the digastric muscle, sends a branch along the neck, and ascends itself forward towards the tongue, where it terminates. The descending cervical branch (descendeas nown.) This nerve is really a plexus of nerves; arises where the hypoglossal nerve forms a hend around the digastric muscle, sometimes receiving a filament from the pneumo-gastric. It descends vertically along the anterior side of the internal jugular vein as far as the middle of the neck, where it bends backwards and upwards to anastomose with the internal descending branch of the cervical plexus, under the sterns-childsmastoidens muscle, and over the common carotid artery and internal jugular vein. This anastomosis forms a reversed arel, from the convexity of which proceed several filaments, constituting a small plexus. This branch furnishes no twig until previous to communicating with the cervical plexus, it gives off two anteriorly, which soon unite, to proceed under the omo-hyoidens muscle. There they separate again; one of them loses itself upon the inner surface of that muscle; the other traverses it, gains the sterno-byoidens, and divides in its substance as far as its inferior uttachment, sending some illaments to the sterno-thyroideus muscle. The small plexus which terminates this branch gives of several sets of twigs. The internal glide under the ome-byoidens muscle, and enter the sterno-thyroidens. The external descend under the omo-hyoideus, and are lost in its scapular extremity. The inferior proceed along the common caretid artery, farnish filsments to it, and communicate with the fourth and fifth cervical nerves. The lingual branch is the continuation of the hypoglossal; it enters between the myla-hypideus and hyo-glossus muscles, increases in volume by the separation of its fibres, gives off a large twig to the thyrohysidous muscle, receives one from the superior cerviral gauglian, and sends filaments to the constructor phasryngis superior, stylospharyogens, graio-hyoldens, mylu-hymideus and genie-glooms. In the two last muscles there is observed a anion between one of the Illumenta of the hypo-glossal nervo and the myle-hypoid plaments of the inferior double move. Several filaments ascend upon the outer surface of the hyu-glossus muscle, form there a plexus, and communicate with filaments of the lingual branch of the inferior maxillary nerve. At the anterior edge of the hyo-glowns muselo, this branch diver, along with the lingual artery, between the genioglosous and lingualis muscles, and directs itself inwards, forwards, and upwards. It then terminates, at about an fach from the point of the tangue, by filements, which have themselves in its blooky fibres.

474. The Certical partition of the sympathetic system of nerves may be traced by commencing with the Neperior Certical Gauglion, erroneously considered by some as the commencement of the whole system. See

" Sympathetic System of Nerves."

475. We shall next antice, but move briefly, the divisigns of the Cervico-epipaland Durant-spinal nervertanni in the mak; the previous dissection of the muscles, and the arction of the clavicle and sub-clavies consele, (probably made by this time,) will have safficiently exposed all these nerves. There are eight pairs of corrie co-spinal and our pair of darsal arryes, the univeloc branches of which will have been uset with in this dissection. The first pair is also called sub-occipital. II leaves the canal by the noteh behind the combles of the overpital bone, over the posterior arch of the atlas : the remaining correct nerves leave the card by the furantian inter-certebrolia. Each of the america branches of the around, third, and fourth pairs of corvical norms, ofter receiving a filament from the superior pervical ganglion, bifurcates and unites with the following and the proceeding by two twigs, forming an arch from the convexity of which proceed others which again units more externally. It is of those meantaments, that the Corplest Please is formed. It lies upon the scalends posticus mustle, on the outside of the pneumo-gastrie nervo, carotid actory, and jugular voin, under the pusterior edge of the sterno cheido-mastoideas, it communicues above with the first everind nerve, helico with the brachial plotos, and intercully with the superior and middle servical ganglia. It woods filaments to the spinal accessory nerve, furnishes some to the muscles, and gives off various branches distinguished into internal and external descending, ascending and superficial covalent.

470. The Physnic or Interval Respiratory nerves is formed by filaments from the third, fourth, and even sometimes lifth pair of cervical nerves it descends at first between the rectus capitis antious major and the scalenus, then crosses the anterior surface of the acalenus in a slanting manner, towards its inner edge, and thus penetrates into the thorax between the sabelayiun vein and artery, crosses the interestl mammary arrery, and enters for a short way the anterior mediastinum; its further course through the thorax to the dianh agm has been already described. The anterior branches of the four inferior pairs of cervical nerves unite with that of the first dorsal to form the wellbry or brackial plexus; this extends downwards following the course of the subclavian artery to the axilla, giving off the branches which supply most of the moreles of the shoulder and arm; the places is situated at first between the scalenus actions and medius, then below the subclavian muscle, and above the first rib. The posterior branches of these eight pairs of corvice-spinal nerves supply the museles and integuments of the back of the neck and head.

477. The arteries met with in the dissection of the face and needs, are the carnide and subclavian of each side, and their branches. The right common carotish tegether with the right subclavian, arise from the arteria immunicata. If the monulation of the account and proximal end of the clavicle be removed, the whole of the arteria immunicata may readily be exposed. It arises from the top of the arch of the north account obliquely to the right side over the tracken, and divides apposite the articulation of the clavicle and steraum into two great arteries, the right subclavian and right remone carotid; a small artery opensionally arises from it, the middle theyrold artery.

478. The COMMON CAROTID ARTERIES resemble each other in their course and termination, but there is an important difference in respect to their origin,-the right arising, as we have seen, from the brackio cephalin-the left springing directly from the arch of the sorta,-the right comes thus to be shorter than the left, -somewhat larger also, and placed more auteriorly, they diverge in their course upwards and backwards, as high as the superior edge of the thyroid cartilage, or even the os byoldes, opposite to which each divides into two branches, the internal and external carntids. At first the left carotid lies altogether within the thorax, this may be called its thoracic portion, it is here covered by the sternum and left vena innominata, but in the neck, both carotide have the following course. In the lower part of the neck, anteriorly, the left caretid is covered in its lower part by the left year innuminata, the thymns gland and the claviele. In the lower part of the neck both carotids are covered by the sterno-unstoldel, sterno-hyojdel, sterno-thyroidel and platysma-myoides muscles, but higher up in the neck. after having ascended behind the omo-hyoidei, they are directly covered by the platysma-mycidei on-Posteriorly, the common carotids are applied upon the vertebral column, upon the inferior thyroad arteries, longa colli and recti capitis antici majores muscles. Internally, they correspond to the traches, the thyroid body, the larynx and pharynx. That of the left side is moreover in relation with the assophagus. Externally, they correspond to the internal jugular. wans, the pneumo-gastrie nerves, and the communicating cords of the superior and middle cervical ganglia. The common carotid arteries preserve the same calibre. give off no branch, excepting some very slender ramincations to the neighbouring muscles. The sheath of each excetid is an important point of surgical anatismy; it is composed of dense callular substance.

479. The INTERNAL CARSTIO ARTERY separates from the external behind the digastrious muscle, enters the space between the rames of the inferior suntills and the pharynx, and ascends inwards, becoming deeper as it approaches the skull, into which it enters by the entertion canal. It is accompanied externally by the in-

ternal jugular vein, internally by the poeumo-gastric nerve, the superior cervical ganglion, and the (wig by which it communicates with the middle cervical ganglion. It forms at first a curve whose convexity rests upon the vertebral column; near the skull it presents another having its convexity directed downwards. Its oltimate course will be afterwards traced.

480. The EXPERNAL CAROTTO ARVERY is equal in size to the internal carotid, excepting in children, in whom the internal is larger. The external carofid extends from the upper part of the larynx to the neck of the condyle of the lower jaw. Placed near the internal carotid at its commencement, and even situated internal and anterior, it escends parallel to it until under the digastric muscle, where it crosses its direction and gains the angle of the jaw. It then proceeds between the car and the posterior edge of the lower jaw, concealed by the parotid gland, and divides into two branches, Towpoeul and Internal Maxillary Arteries. Inferiorly, the external carotid is covered by the platysma-myonles and the skin; but it sinks under the hypoglossal nerve and the digastricus and stylo-hyoideus muscles, and lastly under the parotid gland. Internally, it is in relation below with the internal carotid artery, at the middle with the stylo-pharyngeus and stylo-glossus muscles, and above with the styloid process of the tempural hone. Its branches are distinguished into, 1°, centerior, viz. the Superior Thoroid, Lingual, and Facial Arteries ; 20, posterior, viz. the Occipital and Auricular Arteries; 30, inser, Inferior Pharyngeal Artery : and, 4', terminating, Temporal and the Internal Mazillury Arteries. Lately, an additional branch or two has been added to these, viz. the ar. sterno-masteidea and the ar, transver, faciet,

481. Supantien Tuyroun Agreev arises from the fore part of the external carotid near its origin, or even opposite to it, descends inwards and forwards towards the side of the larynx, changes its direction, and proceeds towards the summit of the corresponding labe of the thyroid body. In this course it is covered from without inwards, by the platysma-mynides, omo-hypideus, and sterno-thyroideus muscles, to which it gives twigs. Its branches are the laryngeal, crico-thyroid and proper thyroid.

482. The Lingual Angusty arises from the estatutal carotid, sometimes by a common trunk with the facial array. It first arounds, due sting hard inwards and forwards; enters between the hyp-glossus muscle, near its interior attachment, and the constrictor plantyngis medical bonds appeared, and descends between the hype-glossus and genic-glossus muscles, and barward the hype-glossus and genic-glossus muscles, and barward the hype-glossus and genic-glossus muscles, and barward how of the hypid lines, as far as the release the langua. There, it becomes borizontal, and, under the imagen. There, it becomes borizontal, and, under the imagen array, between the genic-glossus and domain muscles, to the point of the tongue, where it anastomose with that of the other side by an arch. Its branches are the dorsal arrays of the tongue, and conclusion of

sublinemal.

483. The FACIAL ARTERY prises from the fore part of the experied carotid, almost the lingual artery, and behind the digastricus muscle, directs itself transversely inwards and forwards, and gains the inner part of the angle of the lower jaw, covered in this course by the hypoglossal nerve, the digastrious and style-hysidens muscles and the sub-mouthey gland. It then turns between that gland and the base of the jaw, changes like direction, ascends obliquely towards the community of the lips, between the triangularis and musuter muscles. povered by the skin and the plans min enyoides. Near the free edge of the upper tip, it enters under the union of the levator anguli aris and trinogularis museles, and ascends upon the side of the ness, as far as the inner angle of the eye, where it terminates either by anastomosing with the usual twig of the uphthalmin artery or with the infra-orbitar, or by spreading out its to go in the neighbouring parts. In the second part of its course, it is separated from the skin by far, and corresponds successively and posteriorly to the inferior maxillary hope, the huseroster muscle, the orbicularis oris, levatav labii superioris and levatar labii superioris alasque mass. Its branches in the nock are, the inferior pafaitne and cobmental.

484. The Occarrian Annual arisin from the pasterior part of the external caratal, under the parotid gland, and opposite the tingual artery. It ascends at first addiquely backwards, beneath the correspondents.

mastoideus muscle and the hyperglessal nerve. It then panes borizontally between the transverse process of the atlas and the mustoid process, after crossing the direction of the internal jugular vein and pneumo-pastric nerve, above which it is situated. It then bends back upon the occipital bone, envered by the splesius muscle, under the inner edge of which it emerges to become submitmens, and accends in a tortuous manner upon the back part of the head where it terminates. It gives off many muscular and outaneous branches in its course.

485. The Perfection Augustian Agency is one of the smallest branches of the external carolid artery, arises above the digastricus monele, and extends to the inner surface of the nariole. It ascends at first backwards, covered by the parolid, between the smalled process and auditory entally conclude the markets, it laforestes these of its branches, placed before the other, expands over the inner surface of the nursele, between the skin and the cardiage; the other power over the masted process, and divides into twige capalying the temporalis and retrahens auticulan muscles, the epigranial apparencess, &c.

486. The INERROS PHARYNGEAL ARREST, smaller than the posterior agricular, more deeply situated than the other branches of the external carotid, from which it arises at the same level as the facial. It accords at first vertically along the lateral and posterior part of the pharynx, between the external and internal carotids, covered below by the stylo-pharyngens muscle, and above by the constrictor superior. During his previous dissection of the parentid gland, the student will have traced the two remaining branches of the external carotid artery, but it may be advantageous to resume shortly their description here.

487. The Tenrorae Aureny. Not so large as the internal maxillary, from which it separates apposite the neck of the coudyle of the jaw, ascends at first obliquely outwards between the ramps of the jaw, the auditory canal, and the paratid gland which covers it as far as the rygomatic arch. But above the latter it glides in a tortuous manner under the auterior and superior

muscles of the ear, and becomes subminances. Arrived at the middle of the temporal region, it divides into two branches, an anterior and a posterior. It is from this array that the transverse artery of the face

generally arises.

48S. The INTERNAL MAXILLARY ARTERY IS TOmarkable for its complex course, and for the important branches which it gives off to the deep parts of the face. Immediately after its origin, it passes behind the neck of the condyle of the jaw, bending inwards and downwards, advances inwards, between the dentar and lingual nerves, reaches the interval between the pteryguidei muscles, where it clauges its direction, procording to the maxillary tuberosity. It then bends, hecomes vertical, glides between the two fixed insertions of the pterygoidens externus muscle, and ascends in the bottom of the zygomatic fossa between it and the tempocalis muscle. Finally, arriving near the floor of the orbit, it again takes a borizontal and transverse direction, enters the spheno-maxillary fossa, and divides into anyeral branches. Its branches, which the student, however, cannot trave at this stage of the dissection, are the Middle Meningeal, Inferior Dentar, Deep Temparal, Buccal, Alveolar, Infra-Orbitar, Videan, Pterygo-Palatine, Superior Palatine, Spheno-Palatine,

489. Sun-CLAVIAN ARTERIES. The right, generally larger than the left, arises from the arteria innominute. The left arises from the norte at the end of its arch : Both extend as far as the upper part of the first rib, in the interval of the scaleni muscles; but the right is obviously shorter than the left. They differ in their position, direction, and relations to the neighhouring organs. The right subclavian is more superbrial than the left, which appears to depend especially upon the direction of the arch of the sorts. The right directs itself abliquely autwards and upwards as far as the interval of the scaleni muscles; the left ascends vertically to near them, and suddenly turns outwards to pass into their interval. Thus the naterior vide of the right substavian is covered, from within outwards, by the classic, the sterno-hyuidei and sterno-thyroidei muscles, the corresponding subclavian vein, and the right pacuma-gastric and phrenic nerves, which cross

its direction. Its proterior side is separated from the vertebral column and longus colli muscle by a considerable interval. Its outer side approaches the top of the long, and the inner leaves a triangular space between it and the right common carotid artery. The auterior side of the left subclavian is covered at first by the pleura and vena innominata, then by the premuogustrie nerve, which, instead of crossing its directions. runs parallel to it. Lastly, the first rib, the claviele, and the sterne-thyroideus muscle are applied upon it in a distant manner. Its posterior side rests upon the vertebral column and longus colli muscle. Its outer side lies upon the pleura; the sency corresponds to the common carotid artery. The subclavian arteries traverse a considerable space without furnishing any branch; but in the vicinity of the first rib, before passing between the scaleni muscles, they give off a pretty large number, of which the vertebral and inferior thyroid come off from its upper side; the internal mammary and superior intercestal from its lower, and the transverse cervical, supra-scapular and deep cervical from the outer. Of these branches

490. The Ventennal Asteny is the largest; it is especially intended for the upper part of the medalla spinnlis, cerebelling, and corebrum. On both sides it lies at first behind the inferior thyroid artery, upon the vertebral column, and between the longus colli and scalengs antices muscles; it soon afterwards enters the foramen at the mot of the transverse process of the sixth, often of the fifth, or even fourth cervical vertebra; its vem accompanies it, and a branch of the sympathotic system of nerves. If the student proposes tracing these vessels, he must, with a pair of delicate but strong bone nippers, lay open the osseous canal, through which they pass as high as the occipital bone. The artery, after a remarkable turn behind the occipital condyle, passes through the membrana annuli posterior; and thus entering the foramen magnum of the occipital bone, it joins the opposite vessels, and forms the burian artery within the cranium. Whilst passing up the neck through its osseous canal, it is placed before the roots of the rervical mayer.

491. The INFERIOR THYROTE ABTERT HEALTY

comes from a short axis from which arise other branches, more especially the transversalis celli and transversalis humers, or superior and posterior scapular. It ascends at first vertically upon the scalenous antices, and, or arriving before the fifth vertalera suddenly bends inwards, passes transversely behind the common carotid artery, and goes to a tertanna manner to the thyroid budy. From this vessel usually comes

492. The Ascuspino Convicae Annual, ascends upon the scalenus antions and longus colli muscles, arrives at the rootus capitis antions major, furnishing ramifications to the splenius muscle and lymphatic glands; it anastomoses with the vertebral, posterior

cervical, and uncipital arteries.

493. The Israelean Managery Arreny arises from the subclavian at the same level as the inferior thyrnid; dose all inwards before the scalenus antiems muscle, and externally of the parenic nerve; enters the thorax, along the posterior surface of the sternomatal analysis and interest intercestal analysis, whose direction it crosses; gradually approaching the sternam, places itself between the triangularis sterniand the walls of the thorax, and, towards the xiphoid cartilage, divides into two branches, which are prolonged into the walls of the ablument. To dissert the arrory, remove the cartilage of the ribs and intercoral muscles, or divide the sternum vertically with a saw, and fager the two sections assumber.

494. Scennice Interestal Astrones. It will be difficult to get a view of those, but if the thorax has been extensively opened previously, they may be traced from the subclavian into the thorax, and bolied the pleam, and over the neeks of the first, second, and sometimes the third riba, thus supplying the three interestal spaces. The left artery gives off more

branches than the right.

495. The Tuasavunan Convicas Aureny frequently arises from the thyroid axis. Directing itself transversely outwards, it winds along the scaleni nonschedulative the nerves which form the brachial plexas, in the triangular space between the storno-elejde-mustoideus, trajectius, and claviole, where it is envered by the first of these muscles. It then curves and descends

obliquely backwards, under the trapezius and levator anguli scapule muscles, changen its direction again, and descends vertically under the rhamboideus muscle, along the posterior edge of the scapula, where it gets the name of poderior scapular (art. scapularia paderior), to terminate by subdividing mean its interior angle.

40%. The SUBMINICIAL CERVICAL ARTHRY is usually a branch of thin. It proceeds he a turn in way to the splenius and trapezius muscles, supplying in its course the lymphatic glands, which lie here in great

abundance, and the integuments.

497. The Supra-Scarulan Anteny, called by some the transversalis howers, is less voluminous than the preceding, and often a branch of the interior thyroid; proceeds in a torthous manner from within outwards, behind the chaviele, covered by the sterior-child-mastoidens, platysma mysides and trapezius muscles, and arrives at the upper edge of the sequile. following exactly the course of the supra-sequilar nerve. On arriving near the supra-spinatus muscle, it passes above the coracoid ligament dives between the supra-spinatus muscle and the bone, directs their ourwards under the clavicle and aeromion, winds over the edge of the spine of the seamonia, and enters the fosse infra-spinatus.

498. The DEEP CERVICAL ARTERY areas from the posterior and deep part of the subclavian; externally of the inferior thyroid, behind the scalenes antices muscle. It ascends obliquely outwards, passes between the two has transverse processes of the mak, after giving small twigs to the scalent, longus colli and rectus capitis anticus anajor muscles, directs itself linekwards, operards and inwards; between the complexus and semi-spinalis calli muscles, becomes vertical, and ends by arcestomosing, towards the head, with the vertebral and occipital arteries, sending ramillentium into the muscles and innegaments. If the student has dissected the muscles on the back of the neck previously, as he ought to have done, he will have met with branches of this artery, lying upon or imbedded in the sensi-spinalis calli and adjoining moseles.

499. The Variou met with in the dissection of the neck are, the terminating tranks of the veins from the face, the external jugular, which has been already described (449), and the Internal Jugular. This great vein commences in the jugular fases, and is the continuation of the lateral sinuses, &c. It follows the course of the internal carotid arcery, and afterwards of the common carotid artery, inclused to the same shouth and upon its outer side; in the inferior part of the neck it joins the subclavian vein, and thus forms the vena innominata of the right and left sides. These follow a different course, but ultimately units within the thorna to form the vena cava superior, which terminates in the

right auriele of the heart.

500. SURGICAL REGIONS OF THE NECK. Triongular spaces. These are, of course, quite ideal, and must mislead the surgeon who proposes substituting their outline for the correct anatomy of the neck. Indeed, this mechanical mode of subdividing any part of the hody into artificial regions, ought to be discouraged as much as possible, more especially by the teacher and student of anatomy; it establishes, or tends to establish, false and funciful ussociations, instead of practical and useful ones. But as there are examinating hoards unhappily so constituted, as to require some knowledge of these triangular spaces on the part of the student, we shall been briefly trace their outline. The anterior margins of the sterno-mastoid muscles, the base and symphyses of the inferior maxilla, and the upper edge of the stermus, form together a large triangular space, whose apex is downwards and hase upwards. The mesial line will divide this into two equal halves, and thus are formed the anterior lateral triangles of the nock. The posterior margins of the mustaid muscles, together with the trapezius, the clavicle inferiorly, and mastoid process superiorly, constitute two other triangular spaces; these are called posterior Now, each of these triangular regions has been divided into two others by the amo-hyudens muscle, crossing the neck obliquely below the mustoid muscle, from the body of the os hyeldes to the earliest region of the scapula. Thus, these four triangular spaces on each side are named-outerior superior, onterior inferior, posterior superior, posterior informe-The anterior superior triangular space, is bounded by the anterior margin of the sterno-mastoid, soperior belly of the ome-hyoideus muscles; the apex is inferior where these museles decussate, it has no well-defined basis towards the jaw. It is here that the great vessels and nerves are so superficial, and where the surgam prefers, when it is optional with him, to tie the common carotid artery in the apex of this triangle. The auterior inferior triangle requires to be made by the dissector; the lower and middle portions of the sterno-mastoid muscle must be drawn forcibly outwards, and the paris beneath cautiously dissected. This will display the unterior and inferior triangle, bounded superiorly by the superior belly of the emo-leyoid, messially by the middle plane of the neck, posteriorly by the sterno-mastoid. If the dissection is delicately conducted, the first structure which will be seen are branches of the decendens noninerve, a portion of the common carotid artery, jugular vein, and nervus vagus; but these are, as we have temarked, all envered by the sterno-mustaid, sterno-hyold and sterno-thyroid muscles. The posterior superior triangle is bounded by the posterior helly of the omohyoid, mustaid and trapezius muscles; it abounds with collular substance and lymphatic glands, a great part of the cervical plexus of nerves. The posterior inferior triangle, seldom exists naturally because the inferior belly of the sono-agondour muscle is very commonly attached to the upper margin of the clavicle, or runs parallel to it, and the fascia of the neck connecting them together, completely shuts up this space from the view of the student at first. On cutting through the fascia, and dissetting or cleaning the inferior belly of the omohypotheus; this may be slightly drawn upwards, and a triangular space formed, whose boundaries may be described (though by no means in an accurate way), to he the one-hyuidens muscle, sterne-masteid, and clavicle, or rather first rib. It is a very important region of the body, as in it is found that portion of the subclavian artery, which the surgeon prefers tying in the operation for axillary ancurism. The subclavian vein will be found internal to the artery. The nerves which form the Irrachial plexus, lie above the artery in the upper part of the space.

501. Mourie, Phaness, and Larrens. To obtain a view of these parts, divide the trackes, esophagus,

and great vessels and nerves, about an look above the sternum, raise them up, cutting through the locue cellular substance, consecting them to the anterior part of the corvical vertebras, draw them well forward, and introducing a saw close to the vertebras divide the basis crawii on each side, hereven the styloid and masteid processes, but always behind the stylnid. These two sections should meet each other in the batiher portion of the oscipital home in front of the foramen magnam. We thus loove the superior part of the spine, its connection with the occipital bone, and consequently all its important ligaments, for after dissection. Under particular excounstances, the student may wish to preserve the head entire, in which case, making up his mind to sucrifice the ligaments, he cuts through all connection between the occiput and spine, and thus gets a view of the pharynx. So, similar to the first, but we think not so manageable. The pharyax and mouth, must now be fully distended with baked hair, place the preparation in its anterior ospect, and proceed to examine the posterior aspect, or that part which lies immediately on the bodies of the pervicul vertebras.

502. The Pharrys is a muscular and membranous bag, placed in the median line of the budy, and somewhat funnel shaped; it extends from the hard of the grantum, in front of the vertebral column, to about the fourth or fifth cervical vertebra. Limited share by the basilar process of the occipital home, continuous heliowith the asophogus, anteriorly with the useal feese, mouth, and eavity of the laryox, corresponding to the volum polati in their interval; pasteriorly, it viots apout the vertebral column, longi calli and recti capitis antici muscles. On its sides, it is in contact with the common and internal carotid arteries, internal jugular vents, nnesus-gastrie nerve-, and, at its apperment part, with a small portion of the internal pterygoid muscles. Superiorly, the plaryns is attached in a solid manner to the busilar process by the cephala pharyageal opponeurosis, to which are attached some of the fibres of the superior constrictors of the plaryus. Stranger and denser at the middle than on the sales, is there constitutes of itself the fixed part of the organ. Inferiorly, the termination of the pharynx in the casephagus is indicated by a sudden contraction at the exterior, and renfered very remarkable by a change in the direction of the muscular fibres. In a general cay, therefore, the pharyux may be described as a bag, placed between the mouth, and laryns, which are in front, and the cervical region of the spine, which is behind, and into which hag pass the air, whether breathed by the case or mouth; and the food, solid or liquid, which passes directly from the mouth into the phorypx over the surface of the tongue, by an operate which the student may assumine at this stage of his dissection, simply by opening the mouth. The aporture by which the mouth communicates with the pharynx, is called the interns faucium. Depress the tengue, and look through the istlemus faucium into the plaryax, and observe the superior aperture of the pharynx, which also leads into the laryon. Thus the air which ultimately passes into the longs by the larynx and traches, can reach the take only through the pharynx. Next proceed with the dissection of the constructor muscles of the pharynx, by removing carefully, and in the direction of the fibres, the pharyngial aponeuroses which cover them, preserving at the same time, whatever lateral parts may still remain.

500. The Construction Pharmagners Investor arises helow, from the outer part of the crievid cartilage, partly from the traches, small horn and the oblique ridge of the thyroid carrilage, behind the crico-thyroideus and sterno-thyroideus; its fibres proceed backwards, inwards, and upwards; and in the median line, they are incorporated with those of the opposite muscle by a kind of rapide. Its miley rarface is covered externally by the sterne-thyroideus, the thyroid body and trunk of the carotid artery a posteriorly, it corresponds to the rectus capitis anticus major and longus calli muscles and with the anterior vertebral bigament. The inner surface is rovered by the constrictor medius above; by the palato-pharyopous and style-pharyngaus museles, and the mucous membrane of the pharynx, to the middle; and by the thyrnid and orienid eartilages below. The apper edge is oblique, forms an ageste angle with that of the opposite side, and ascends more or less high, sometimes to near the occapital home. Upon this edge, and between it and the constitute another, will be found the superior laryngeal nerve, The lower edge is transverse; connected with the commencement of the exaphagus, and allows the inferior laryngeal branch of the pneumo-gastric nerve to pass

under it anteriorly.

504. Constructor Phartners Medius arises from the refiring angle formed by the union of the large and small horns of the Irvoid bone, and from the whole extent of these two hony appendages, as well as from the style-byoid ligament. The inferior fibres pass downwards and backwards; the middle transversely, the superior ascend obliquely; they are all interlaced with those of the opposite side, forming at the posterior part of the pharynx a raphe, whose inferior extremity is roccealed by the preceding muscle, while the upper is attached to the basilar process. Covered, in its outer surface, by the hyp-glossus and lingual artery externally, and by the constrictor inferior behind and below; in the rest of its extent, united to the muscles of the anterior part of the cervical vertibre, and to the auterior vertebral ligament. The inner surface is covered by the mucous membrane of the pharynx, the stylo-pharygens, palato-pharyagens, and constrictor supering. The stylo-pharyngeus muscle and glosso-pharyngeal nerve are situated between this muscle and the following.

505. CONSTRICTOR PHARYNGIS SUPERIOR Arises. externally from the lower half of the edge of the intermal using of the pterygoid process; from an aponeurosis extending from the prorygoid process to the posterior part of the inferior alveolar arch; from the extremity of the myloid line; from the sides of the base of the tongue, between the stylo-glossus and hyo-glossus muscles. The fleshy fibres of the first origin descend backwards and presently ascend towards the base of the erguium, so as to form a sort of arch. They are attacked to a thin yet firm aponeurosis (the exphalo-phurangeal), which is attached to the basilar process, but only by its extremities, so as to leave an empty space between the hone and its middle part. Here therefore the noucous membrane of the pharyux may be seen not covered by any nescular fibres; this space is called the simuses of Margagai. The other fibres proceed in

a transverse direction, to be interlared with these of the opposite muscle in the middle of the posterior part of the pharyns. The outer surface is covered posteriutly by the constrictor medius, and laterally is in connexion with the stylo-glossus, mylo-pharyngeus, internal carotid artery, internal jugular vein, pneumo-gastrie, hypo-glossal, spinal accessory nerves, and several filuments of the superior cervical ganglion of the sympathetic. These different parts are contained in a triangular space, filled with cellular tissue, which occursbetween the constrictor pharyngis superior and pterygoideus internus. Its inner surface cuvers the palatopharyngeus and levator pallati multis, and is lined by the mucous membrane of the pharyox. From the description of these muscles, it will be seen that they all three cover each other, in such a manner that the lower only remains visible in its whole extent, and they also all unite in the middle of the pharynx with those of the opposite side by a sort of raphe, and thus some of them require to be divided before the others are fully seen, They contract that portion of the digestive caml when it is filled with alimentary substances. The constrictor medius raises the os byoides and laryns, carrying them backwards, and the inferior raises the laryny. It is at this stage of the dissection that the student can best follow the anatomy of the stylo-pharyngeus which for special reasons was formerly described.

506. Next open the bag of the pharynx by an incision made along the mesial line, extending from the bazilar process of the occipital bone to the commencement of the resophages, and it may also be convenient to cut the pharynx laterally for a short way in the situation of the sinus of Morgagoi, at least on one side-Looking into the pharyux which has been thus laid open, the following apertures may now be observed: the posterior apertures of the nostrils and anterior openings of the Eustachian tubes; suspended beneath those is the velum pendulum palati, and medally the uvula; beneath is the isthmus faucium or opening from the mouth, bounded by the base of the tangue inferiorly, the relunand avula above, and laterally the pillars of the fauces with the tonsils. Connected with the base of the tangue is the epiglottis, immediately beneath which is the superior aperture of the laryny; lastly inferiorly the stadent will find the opening leading directly to the pullet; thus there are seven openings leading to us from the pharyns. The boundaries of the other opertures may he easily understood. All the surfaces here mentioned are covered by a continuous marrous membrane lining nut unly the interior of the pharyon, but messing along the various tubes already mentioned to the nostrile, ears, larvay, trackes and lungs, and by the guller towards the stomach. The stodent must carefully observe the form of these different openings. The nostrile being bounded by hard parts which do not vary, those of the Enstachian tubes looking forward and composed of an extremely thick and dense filtro cartilage; this will be examined afterwards in relation to the eavity of the tympanum to which the tule lends. opening into the larges is protected by the epiglottis which follows the movements of the tongue, and it is bounded laterally and ponoriurly by the arytomsepiglottic folds, arytenoid massles and cartiloges; these however cannot be seen until the mucous membrane is removed which must not be those at this stage of the dismetion.

507. The PALATE is the upper wall of the mouth, limited anteriorly by the adhering edge of the upper lip, posteriorly by the buss of the relum pulats, and laterally by the checks; a white line, slightly depressed, traverses it mesially. At the auterior extremity of this line, between the two middle incisors of the upper jaw, is a small tuberele which curresponds to the inferior ordice of the anterior pulsatine canal. The Bong Parties of the Palate is formed by the upper alveolar arch, the inferior surface of the pulating processes of the superior maxillary hones; and the horizontal portions of the palate hones. On the vault of the palate, the mueous membrane is deaser, thicker, and less red than in the other purts of the mouth. At its anterior part, it presents transverse rugosition, varying in number and extent, elsewhere it is smooth and presents the princes of sources didlicles situated between it and the bony arch of the pulate, which become more numerous near the velocity. The game are formed of a firm and compare reddish times, povering the two sides of each alveolat

arch, and filling the intervals which remain between the teetle, the necks of which they closely surround, They appear composed of two layers, a pulpy and a librous, covered by the mucous membrane, united to the periostrum. The mucous membrane which enters into their constitution, is prolonged into the alread, and from the bottom of these cavities, sends into the ravity of each of the teeth a bulbous prolongation which exactly fills it, and which has been named the pulp or nucleus of the tooth. The arteries of the palate and gums come from the palatine, alveolar, infra-orbitar, facial and brecal branches, and for the lower gums in particular, from the submental and mental. The veins correspond to the arteries. The nerves are furnished by the palatine, facial, infra-orbitar, superior and inferior dentar nerves, and by the nasu-palatine ganglion.

508. The VELUM PARATS is a suit; broad, thick, mabile gartition, appended to the extremity of the vault of the palate, and separating the mouth from the pharyna. Its form is nearly quadrilateral. Its two surfaces, the auterior and posterior, are smooth. Its upper edge is very thick and fixed to the vault of the palate; the lower orige is free and floating above the base of the tongue. It presents at its middle part an appendage or profongation named the Uesla. The nyula is cone-shaped, forming the inferior edge of the relum palati into a double arely terminated on each side by two pillars which are continuous with the rongue and the pharyus. These pillars are placed the one before the other, and separated by a triangular space in which are ladged the tonsits; they are united above but diverge below. The anterior is oblique, and contains in its substance the constrictor in thesi figurium. muscles. The pasterior is nearly vertical, and formed by a portion of the palata-pharyageus muscle internal-Iv. The Muctous Layer of the Velum Palati contains the unuscular layer, and is continued anteriorly into the membrane of the mouth, and posteriorly into those of the mosal force, so that the palatine and piturbary mombranes unite upon the free edge of the velous polati-The anterior lamina of this layer is less red than the posterior, and covers many murous follicles, extending over the fare part of the muscles, and are so close as to

ise is contact with each other; they form of the monty concarly the whole thickness of the uvola; they are rounded and compressed. Beneath the velum poolution polar, is the aperture of the mouth, the form and limits of which we have already described, its size is in no case equal to that of the anterior aperture; it varies, however, but only from always downwards, for on the sides it is limited by the pterygoid processes, which of

course are perfectly fixed.

509. The Circumplexus Palati (Perinophylinus Externer), is found in the substance of the relum, arises, by aponeurotic fibres, from the agaphoid fossa of the pterygoid process, the cartilage of the Eustachian tube, and the parts in the neighbourhood of the great wing of the sphenoid bone, it descends vertically along the posterior edge of the inner plate of the pterygoid process, and turns under the bank by which it terminates, it then proceeds horizontally inwards, is expanded in the velom palati, before the levator palati mellis, unites with its fellow, and terminates at the transverse ridge, which is observed upon the inferior surface of the horizontal portion of the palate bone. There it sends off a prolongation to a dense and compact membrane, which keeps the velum palati firm at its upper part The fleshy portion of this muscle is covered, externally, by the pterygoidous internus. Its inner surface is applied against the levator palati mellis and constrictor plaryngis superior, and against the inner wing of the pterygoid process. Its aponeurotic portion is covered autoriorly by the mucous membrane of the yelum pulati. Posteriorly, it is connented with the pulatopharyageus. It stretches the velum horizontally,

510. The Levator Palati Mollis (Peridaphylisus Interner), is situated on the sides of the pesterior apertures of the mosal fossie; arises from the under surface of the petrous process, before the external orifice of the carvid canal, and from the neighbouring part of the Eustachian tube. From thence it descents obtopody backwards and inwards, becomes broader, and terminates at the middle part of the volum pulationiting with that of the opposite side, the levator availability and a little with the pulatio-pharyogene and the aponentusis of the circumflexes palati. Its outer avertors

corresponds above to the circumfloxus palati, and below to the palato-pluryogens and constrictor pharyogis superior. The inner is lined above by the ourcous membrane of the pharyux, and below by that of the volum palati. It raises the velom palati so as to apply it ogainst the peaterior apertures of the nasal fessor.

511. The Levator Uvena, (Azygov Uvular), occupies the substance of the uvula, sometimes distinct on both sides. It arises from the aponeurosis common to the two circumflex mascles, and descends vertically to the tip of the uvula. It is connected anteriorly with the levator palari mollis, and covered behind by the posterior membrane of the volum palati. It raises and

shortens the uvula.

512. The Palato-pharysches, placed vertically in the lateral wall of the pharyox and in the veinm palati. From its origins being very distinct from each other, it less been divided into three portions, which Winshow described as so many separate muscles. In a general way it may be said to arise from the posterior edge of the palatine vault, intermingling inferiorly with stylo-pharyngeus and middle constructors. It assists in forming the posterior pillar of the fauces. When the two museles act together, they lower the velum palati, while at the same time they raise and shorten the pharynx. It is in deglutition that they principally act. By opening the mouth widely, and depressing foreibly the lower jaw and tongue, the student will bring into view the anterior pillars of the fances, and so be enabled tuilissect

513. The Construction Israel Pareties, situated in the anterior piltar of the volum palati, between the membrane of the palate and constrictor pharylogis superior, before the tousil. Its lower extremity loses itself in the base of the tongue. The apper, which is narrower, is incorporated, in the volum palati, with the palato-pharyngeus and circumillexus palati muscles. This muscle lowers the colum palati, and raises the base of the tongue.

514 The Mourn (Or) is a nearly eval carely, placed harizontally, comprised between the two jaws, bounded laurally by the cheeks, anteriorly by the line, posteriorly by the velum palati and the phoryax,

above by the arch of the palate, and helow by the tongue. The murous membrane may be traced on the free edge of the under lip, of which it lines the peaterior surface, to be afterwards reflected upon the budy of the maxillary hone; there it forms opposite the symphysis of the chin, a fold, more developed below than above, named the Francisc of the under lip, which is lost insensibly upon the lip. The membrane then sends into each alveolus a prolongation which strengthons the insertion of the roots of the tooth, and is continuous with a membraneous laming which lines these envities. From thence it proceeds over the posterior surface of the body of the inferior maxillary bone, forms opposite the symphysis, the Frances of the forgue, covers that organ, gains the epiglettis, and is continued into the inucous membrane of the larynx and pharens. Superiorly it commences on the free edge of the upper lip, forms between it and the superior maxillary bones a fregum, gains the upper alveolar arch, sends prolongations into the corresponding alveoli, passes to the vault of the palate, of which it closes the anterior and the two posterior foramina, receives the nerves and vessels which pass through them, and is reflected over the fore part of the velum palati, on the free edge of which it is continuous with the phalmry membrane. On either side, this membrane, proceeding from the commissure of the lips, lines the cheeks, proceeds over the branches of the inferior maxillary bone, forming a vertical fold opposite their anterior edge. At the backmost part, it turns over the constricfor isthmi faucium, and palato-pharyogens muscles, to form the pillars of the velum pulati, between which it covers the tonsile. Beyond this, it is continuous with the membrane of the pluryex. The mucous membrane of the mouth varies in structure, and is covered by a distinct epithelium. At this stage of the dissection, the student may examine the structure of the lips. At the back of the mouth he will observe the velom pendulum polisti; descending from which, are the two autorine pilare of the fances on each side. To examine there inmorely, our through the cheek on one side, also both pillars of the fauers, and the toned of the same side. The side remaining outire, and thus fully brought into

view, will give him an exact notion of the relative position of the fauces, and of the tensils lying between there.

515. The Tourses (Amgdula) are bodies todged between the pillars of the votom palati. They represent an avoid, of which the large extremity, director upwards corresponds to the point at which the pillars most, while the small extremity, which looks thewnwards, rests upon the ham of the tangue. Their esternal perface adheres to the constrictor phoryneis superior musele; the internal, convex and free, projects, and constitutes the sides of the isthmus of the fauces; their malerior edge touches the constrictor isthan facious musule: the motorior touches the palatu-pharyageus. They are divided into several lobes, and have a gravish colour, and appear formed by a pulpy tissue resembling that of those fulficles. They are filled internally by collules open on their inner surface, whose orifices are large; the mucous membrane of the mostle lines their wall. In their bottom, exerctory doors are observed to oposfrom a mass of follicles, forming the substance of the toneil externally. The arteries of the toneils owne from the lingual, inferior palatine, and internal maxillary arteries. Their nerves from the Jugual and plantsplanyngeal.

516. The Toxocc is very moveable, and extends from the Irvoid bone to behind the incisive teeth; it is used in sucking, mastication, deglocition, spenking, &c.; it has two surfaces, two edges, and two extremities. The upper surface is entirely free, flat, envered by the mucous membrane of the mouth, with a groove running along the middle, and do slong it into two equal lateral portions; towards the back part upon this surface, there is a depression called the foramon execum; from this point two lines formed of papillic proceed forward, diverging from each other; all this surface of the songue is rough with nervous papillae; the fore part of the tongue is called the spex, the central part the body, the posterior part the base. The apex is free infariarly; the budy and base are fixed by numerous and powerful muscles to the inferior maxilla and legoid horn; the edges are also free. The morses membrane covering the upper surface of the tongue passes from it

unimercuptedly upon the epiglattis; three folds may he observed here, one mesial, and two lateral; these are called the figuments of the epigloitis. The tongue is very thick at the level of the forumen erecum, but it becomes thinner as it approaches the hyoid bone; its aper inferiorly is fixed to the inferior maxilla by the fremm linguer, a fold of mucous membrane. The Flinky or Museuler Portion forms the greater part of the organ, and is composed of fibres of the styloglossi, hyo-glossi and genio-glossi muscles ; their fleshy fibres interlace in an inextricable manner, and form at the upper region of the tongue a layer in which it is impossible to discern them, and in which there is interspersed a multitude of small globules filled with an almost fluid fat, placed very close upon each other, which gives them a flattened form, and so much the less red the nearer they approach to the back of the organ. On the sides of the tongue may be distinguished an inferior longitudinal muscular plane, formed by the linguales and stylo-glassi mustles, and another plane lying above the latter, with transverse fibres, formed by the genio-glossi, and surrounded by the proper tissue of the tongue. These interlaced fibres have been described lately by Gordy and others as distinct muscles, under the names of superficial lingual, vertical lingual, and transverse lingual. At the centre of this fleshy tissue, and in the direction of the median line, there occurs a fibro-curtilaginans lamina ur septum, of a whitish colour, stranger behind than before, having its upper edge concealed in the substance of the organ, at a considerable distance from the mucaus mumbrane, and the lower free in the interval of the penia-glassi muscles. This septum is continued postsriorly as far as the body of the hypid bone, add by its two lateral surfaces gives attachment to muscular fibres. To exhibit this clastic septum, the tongue may be out aeross about the middle, or the septum exposed at the hase, ac vertically. The Popullic on the upper surface of the tongue are of three kinds,-leatherlar, from nine to fifteen in number, arranged in the form of a triangle without the base; fingiform, placed near the edges at the point of the tongue; lastly, muical, these are more numerous, and are spread generally over the surlace. The Nevers of the tongue are furnished by the inferior maxillary, glosso-pharyogeal, and hypo-glossal. The filaments of the latter belong especially to its muscles or muccus fullicles; the first is distributed to the mucous membrane, and to the conical papilla. The arteries come from the lingual (branches of the external caratid arteries), and palatine and tonsilar twigs of the labial. Its voins are the superficial lingual, ranine, lingual, and submental; they open into those of the pharyon and laryon. Its lymphatic vessels go to the

gland on the edge of the hyo-glossi muscles.

517. The Lanyn's cannot be understood merely by a dissection of that larynx which appertains to the head and neck, that the student less just dissected. He must apply to his anatomical teacher for the following preparations, the os byoides, a dried larynx, with the upper part of the trachea, -separate specimens (recently prepared, and preserved in weak alcohol) of the individual cartilages entering into the composition of the larynx; with these, and a careful dissection of the laeynx belonging to the head and neck he has just dissected, he will readily make himself master of this organ, which no existing manual of practical anatomy, aided by the dissection of a single laryou, would ever enable him to accomplish. Having put these preparations before him, and cautiously cleaned the larvax, attached to which he must leave the tongue and hyoid bone, let him commence by re-examining the anatomy. of the hyoid bones. The Laryer communicates superiorly with the pharynx, inferiorly with the traches; the plarynx separates it from the vertebral column, It gives passage to the air in the act of respiration, and is the organ of the voice.

518. The Caurinages of the Larrax are nine in number. 17. The Thyroid Cartilage, composed of two broad lamina, having thus something of the form of a shield, honce also called scutiform; these lamino giverise to a projecting angle autoriorly, readily felt under the integuments; posteriorly, the thyroid cartilage is quite open, being defective here; the sterno-thyroid, are more posterior constrictor of the phary na are attached to it. In the hollow of the retiring negle are

attached the ligaments of the glottis, and the thyroarytenoid muscles. The crico-arytenoid muscles are inserted into it inferiorly, and on its outer side. The upper edge gives attachment to the thyro-byoid ligament, and, together with the posterior margin, forms the ascending sursu; there is also an interior curan on each side, avertupping the cricoid eartilage; the crico-thyroid ligament attaches its luterior edge to the pricoid cartilago. 22. The Cricoid Cartilage has somewhat the form of a ring, and forms a complete circle; its connexious above have been already stated; inforiorly, it is connected to the upper ring of the traches. by the filmous membrane of the trachet; internally, it is lined by the mucous membrane of the laryus. The base of the aretemoid cartiloges rest upon it, and it gives attachment to the crico-thyroidei, crico-aryteunides postici and interales. 35 and 45. The Arylment Cartilages, two in number, rest upon the ericald cartilage, and are of a pyramidal shape, the apex being placed upwards; posteriorly, they give attachment to, and are connected to each other by the arytenoid muscles; nateriorly, they give attachment to the ligaments of the glottis, or true rocal cords; moreover, the cries-arytensidel muscles are attached to them. The summit is surmounted by a small cartiloge, (5), and 6°. Cornicalo Largegia) and from their summits proceed the folds of mucous membrane, called anyteno-epiglottic folds. All these cartilages have a homogenous texture, and are upl to become unsened in aged persons. 70. The Epiglottis is a fibro-cartilage. placed at the base of the tongue, with which it is conneeded by folds of a mucous membrane, frends spiglottidis. Its tissue is elastic, the base superiorly, afex inferiorly. The gland of the epiglottis lies in fruit of it. In general, its position is vertical, but it changes and becomes horizontal during deglutition; it serves therefore to sever and protect the superior aperture of the larvax, during the deplatition of solid and bipold aliment. It is two surfaces, a fingual and a larger pul-8 and 9. The Considers Cartilages are two small cartilagus, of a triangular form, with the bose superiorly and spex inferiorly, situated in the oxytenn-apiglottidean folds: their use is to support these folds. They are always present, but are essier felt than demonstrated.

A19. The LIGAMENTS OF THE LANYSK BEE, P. The thyro-hyold and the filtro-cartilagionus ligament of the great horn. 2°. The erico-thyroid membrane. It is this ligament which is opened in laryugotomy: there are also ligaments which attach the small horns of the thyroid eartilage to the cricoid, and a symonal burst to facilitate mation; and others which attach the arytenoid eartilages to the cricoid. 3°. The thyro-arytenoid ligaments which can only be seen upon the deeply dissected larynx are called the interior or true vocal cords; also, the inferior ligaments of the glottis.

520. The Muscles of the Lanyan are easily dis-

sected, requiring no particular directions. Clean first, the grico thyroid, next the crico-arytenoidoi postici by removing the mucous membrane of the pharyex; also the arytenoided; out through vertically one of the wings of the thyroid cartilage, but in such a way as to avoid injuring the salient angle; this will expose the cricoary tenoideus lateralis and thyro-ary tenoideus of one sale. The prion-thyroidel have been already described. Each arises from the side and fore part of the cricoid-eartilage. and ascending obliquely upwards and outwards is inserted into the lower and outer surface of the thyroid eartilage, leaving between it and its fellow an interval occupied by the crico-thyroid membrane. Use to approximate these eartilages to each other; these muscles are farther remarkable in being supplied by branches of the superior laryngcal nerves. The Criro-Arytesodei Postici are also two in number; they are of a triangular shape and arising extensively from the cricoid cartilage, are inserted into the base of the arytenoid eartilage. The Criew-Arytemidens Laterales; much arises from the side of the upper circumference of the cricoid cartilage, and is inserted into the outer and fore part of the base of the arytenoid eartilage. The drufeunidens is a single and very remarkable muscle, masmuch as it crosses the middle plane of the body. It is formed of several planes of fibres having different di-

rections, hence the names of oblique and transverse given to different pertions of it. They connect the

aryteonid cartilages to each other. Finally, this musele is invested anteriorly and posteriorly by a munous membrane.

521. The Grann; of the Lanysk are, 1". The periglottis, attended anteriorly to the epiglettis; and 2". The arytenoid glands, lodged in the aryteno-epiglottic fidds; all three glands are extremely small.

522. The Muones Musina and of the Laryax may be studied 1st, upon the outire larynx : 2d, upon the larynx divided posteriorly by cutting through the crieful cartilage and the arytenoid muscles and mucous membrane. This membrane is abviously continuous superiorly with that of the mouth, and inferiorly with that of the trachea After forming the glosso-epiglottic fields, it invests a portion of the eniglottis and penetrates into the larynx, forming superiorly between the epiglottis and summits of the arytenoid cartilages, the aryteno-epiglottle folds. These folds, together with the epigloitis in front, and the arytenoid cartilages and muscles behind, constitute the superior aperture of the largua-A short way beneath this, and within the larynx are the false vocal conds, or superior ligaments of the glottis, farmed merely of mucous folds, and covering a part of the thyro-arytenoidel muscle. A little lower down, within the larynx, are two other folds; these are the true vocal cords, or inferior ligaments of the glottis, and are formed of the thyro-arytomial ligaments covered by the mucous membrane. The space between these ligaments is called the glottis, or Rima of the Glottia, and is the narrowest part of all the air tubes. It is of a triangular shape, and liable to vary, and may sometimes un cloubt be completely closed at the will of the individual. On each side of the larvax, immuded above by the false vocal eards, and below by the true ones, is a depression or cavity; these are the ventricles or sinuses of the larynx." The mucous mem-

An attempt has been lately made to establish a distinction between the terms plotter and rows of the glottle the experience of the larger they call the glottle. But there can once outling good from sock a distinction, and the experience surviving of the larger should simply be allowed to relate in each. The same parameters soon to think that the same of the glottle and the same parameters are to think that the same of the glottle and the same parameters.

brane linking the laryax is soft, spongy, continually moistened, and of a rose colour. The arteries of the laryax are furnished by the superior and inferior thyroid; the nerves are the superior and inferior laryageal nerves on each side, branches of the purumo-gastric. The dissection, if followed as directed (501), enables the student to dissect the deep neuscles of the neck. Three on each side have been already described, viz, the Scaleni (470); the remaining are the Longi Colls, Recti Capitis Antici Majores, Recti Minores, Recti Laterales.

523. LONGUS COLLI MUSCLE flat, narrow, clongated, lying on the anterior and lateral part of the bodies of the vertebrae, from the atias to the third dorsal, formed of two fasciculi superimposed upon each other: one superior, directed obliquely outwards, extended from the anterior tabercle of the atlas, where it takes its origin by aponeuratic fibres, to the transverse processes. of the third, fourth, and fifth pervical vertebrie; the olker inferior, descends vertically from the body of the axis and third verrebra, anterior tubercle of the fourth to the bodies of the last four cervical vertebric and three first dursal, attached by aponeurotic fibres, also inserted into the fibro-cartileges and base of the transverse pro-Its anterior surface covered by the rectus expitis anticus major, pharynx, carotid artery, pneumogustric nerve, communicating cords of the cervical ganglia and the usophagus; its outer edge is separated from the scalenus antiens by a triangular interval, which lodges the vertebral artery and vein. Its upper entrewdy is confounded with that of the muscle of the opposite side. Use to bend the cerrical vertebras on each other, and on the dorsal vertebrae.

524. RECTUS CAPETES ANTICUS MAJOR lies upon the anterior and lateral part of the cervical vertebras. Four thin, flat tendons, fixed by a pointed extremity to the anterior tubercles of the sixth, fifth, fourth and third transverse processes of the neck, and so much the larger the higher they are, give origin to the deshy fibres of this muscle, which are united into so many imbricated bundles, behind which they are more or less prolonged.

inferior aperture of the latyax are synonymous; it is rather diffiealt to imagine how a practical amounted could have confounted them with each other. It proceeds from below upwards and from without inwards, becaming broader in its progress, and attached to the basilar surface near the occupital forames. Its outerior surface corresponds to the caractid artery, internal jugalar vein, pneumo-gastric nerve, superior cerrical ganglion, and pharyow. Use to bend the head upon the neck, directly, if it nots to conjunction with that of the opposite side, and laterally, if it nots by itself. Detach and reduct the opport part of this muscle.

from the bone. This will display

halfa. The Recros Carryis Astrices Minous situated behind the proceeding muscle, has mostly the same form, but is shorter and narrower; arises below, from the fore part of the lateral mass and of the transverse process of the atlas, by appreciate fibres; it ascends to the auterior amegin of the occipital hole, and the cartilaginous substance which unites the petrons with the bosilar process; terminates behind the rectus saticus major, by this apprecias. It is concealed by that muscle, and covers the atlanto-compital articulation. Use to bend the head upon the neck.

allie Rectus Carrers Lavenauts, thin the and of an alongated equate form; attached inferiorly, by a small tendon, to the upper and anterior part of the transverse process of the athor, ascends vertically to the occapital bone, to terminate at an impression behind the jugular fassa. Its naterior surface is covered by the taternal jugular vein, the posterior corresponds to the variebial artery. It inclines the head laterally and forwards. The student englit now in term this part of the subject and proceed at once to the dissection of the articulations of all the correlations with each other, and particularly of the two first with the accipital bone. The anothery of these articulations together with the modes of dissection them, he will find under their proper lead.

627. Musuans and Newves or time Onney. To understand the anatomy of the orbit it is essential for the student to dissect two orbits. In the first he must dissect the muscles only. In the second the nerves, if the harizontal auction of the cranium for the removal of the brain has already been made, and the section curried close to the supercellary ridges the student will

only have to remove the thin lamins of bone forming the selling of the orbit. A vertical section of the superciliary ridge must also be made, and the saw must not be carried within at least a quarter of an inch of the internal angular process of the frontal hous, a similar section must be made towards the external angular process, but the lower this is cut the better, the chissel or a pair of good home nippers will now remove all the osseous textures which obscure the superior part of the orbit and its appendages. In removing these portions of home, the periosteum must be carefully stripped off and left on the subject.

528. The Levaton Parennes Superiores. Dissess off the periorteum, &c. and the frontal branch of the opticular merve will be observed lying on the muscle. Attached to the meningual sheath of the optic nerve, and by a small tendon to the lower surface of the small wing near the optic foramen, from which it is separated by the rector superior; it is directed borizontally forwards, carven downwards, expands and losing its red colour, descends as far as the fibro-cartilage of the upper eyelid, to which it is attached by a thin appenents. Divide this muscle through about the middle, reflect these and dissert the

529. RECTES OCCULI SUPERIOR (dtollens) attached, posteriorly, near the optic foramen, to the process of Ingrassias and fibrous sheath of the optic nerve, mingling there a little with the rectus interms; it proceeds horizontally forwards to the upper part of the eye hall, becomes appregratic and is connected to the sclerotic membrane. This aponeurosis, as well as that which terminates toward the eye the other three recti, is separated from the eye-hall by a small indistinct synovial capsule, the walls of which are soft, and as it were downy, Its upper surface is covered by the levator palpebra superioris, from which it is separated by some nervous filements, and by the membrana conjunctiva; the inferior surface rests, posteriorly, on the optic nerve, the oplithalmic artery, and the nasal branch of the ophthalmic merve, and, anteriorly, upon the eye itself. It raises the eye. Upon the most side of the arbit will be found

530. Obligates Structure arises by short aponenroses, near the optic foramen, proceeds horizontally to the internal prisitar process, passing honeath the intertad orbitar foramina, forms a rounded tendon, surrounded by a soft and loose sheath; it is engaged in a cartilaginous ring, whose extremities are attached to the home in a moveable manner by short fibrous ligaments. In the interior of this pulley is a synovial capsule which is reflected eyer the tendon, and accompanies it for some way, forming around it a distinct and close sheath; it then proceeds backwards and downwards between the rectus superior and hall of the eye, forms a radiated aponeurosis which descends over the outer and posterior part of the eye-ball, confounding a portion of its filires with the selecatic membrane mear the entrupee of the uptic nerve. Use to carry the ball of the eye forwards and inwards, giving it a rotatory motion, which directs the popil downwards and inwards. Divide this muscle in its fleshy belly, and beneath it will be found the

531. Recres Inventors (Adductor Oculi) eccupies the internal region of the orbit, arises near the margin of the optic hole, and proceeds herizontally formards to the inner ode of the eye. Its internal surface corresponds to the orbit; the orternal to the optic nerve. It carries the eye inwards. Detach the lower cyclid from the inferior margin of the orbit also in the direction of the external canthus of the eye, and draw the eye-half op-

wards and inwards, and thus expuse the

582. RECUES EXPERSUS (Abductor Ocali) from the outer part of the circumference of the optic hole, by short aponeuroses. However these two origins pass the third pair of nerves, sixth pair, and nasal branch of the optithalinic. The muscle then proceeds hurizontally nutworks and forwards, to the outer part of the eye. It corresponds by its external surface to the periosteom of the orbit, and to the behavioral gland c by its internal surface in the optic cerve and sixth pair, as well as in the leathening ganglion. It draws the eye outwards, Divida this muscle, and expuse

533. The Recrus Israelian (depressor used) arises posterically from a tenden common to it with the internal and external recti, and proceeds horizontally towards the ball of the eye, on which it terminates in the same manner as the rectus superior. Its inferior surface is exparated from the floor of the orbit by adipose tissue,

and covered antersorly by the conjunctive. The upper surface is in connection with the optic nerve, a branch of the third pair of nerves, and the eye. It is the antagouist of the restus superior, drawing the eye downwards.

534. The Outroops Increases Ocult is attached to the inner and fore part of the orbitar surface of the superior maxillary hone, outside of the lachrymal groove, directed backwards and outwards, curving upwards upon the convexity of the eye, between it and the rectus externus; forms an aponourous which terminates in the sclerotic membrane, at the distance of two lines from the sutrance of the optic nerve. Its inferior surface rests upon the floor of the orbit; the appey corresponds to the eye-ball and rectus inferior. It carries the eyeball inwards and forewards, and directs the pupil upwards and outwards. When it acts along with the properling muscle, the eye is carried forwards and inwards, which counterbalances the effort made by the united resti muscles. The student will of course during the dissection of the muscles, have seen many filaments of nerves, and particularly the optio, but it is so essential to have a clear comprehenrion of the muscles that, with the exception of the optic, they should all be neglected until returning to the other orbit, or assisting his fellow student who ought to have been looking on during the examination of the muscles.

535. Nerves of the Oxerr, these are the second, third, fourth, and sixth pairs of Cerebral Nerver, together with the Ophthalmic or first division of the Trifa-

rint or fifth pair.

536. The Ownic or Second pair of Cerebral Nerves may be examined on the same orbit in which the muscles were dissected. They traverse the foramina optica, together with the ophthalmic artery which lies beneath them. On entering the osseons orbit, the arachnoid prolongation which had accompanied them from the brain is reflected. A sheath which they receive from the dara major arcompanies them within the orbit. As the nerve leaves the short osseous canal it is received into a fibrous ring formed by the attachments of the muscles of the eye, it

here changes its direction a little, and proceeding nearly straight forward, penetrates the sclerotic coat of the eye-hall towards the interior and inner side of the axis of the eye. The nerve is circularly contracted at the mament of penetrating the toulen selections. A great quantity of fat in nearly all subjects surrounds the nerve in its course from the foramina uptica to the eyehall separating it from most of the other nerves. The ciliary artery and nerves the upon it,-also the coluthalmic ganglion upon its outer side. A librous shouth furnished by the dura mater accompanies it to the edlerotic,-thus the optic nerves have two shoulds, their own neurilema and the one just mentioned. A very tical incision of the eye-ball must be made, upon the fresh eye of any animal, and the dismeter will thus be enabled, by removing the scientile and chemid tunies of the fresh eye, to trace the optic nerve directly to the reline, in which it terminates. The optic are nerves of special sensation, viz. that of vision, and Dr. Arnold thinks that the optic communicates with the superior maxillary by two fine filaments. The dissector will now proceed to take his view of the other nerves distributed to the eye, and its appendages on the opposite and entire orbit. The section of the bonce has been already described, and the dissection of these complex and curious nerves must be commented within the cranium, previous to their coming in contact with the eavernous sinus. If they have been out sofficiently long, on removing the brain, they will readily be found in their respective situations. The third close to the optic; the fourth on the upper edge of the prolungation of the dura mater to the posterior elimid processes; the fillk entering a faramen in the dara mater below that edge a little in front of the meatus auditorus internee; and the siath pur still more in front, and a little lower down. The fourth, which is an extremely fine nerve, and the Afik must first be examined, tracing the frontal and lackrywal branches of the fifth, next follow the nasal branch of the fifth, next examine the third, and finish the examination with the wahilahuie ganglem and ciliary merce.

537. Forever Parm. Pathetic or Troubleator, this nerve, comarkable for its finances, arises at the sides

of the valvule of Virgueens, and after winding round the ovura perchri, penotrates into a sheath formed by the dara mater in the anterior prolongation of the tentorium perchelli externally to the third; it next places itself upon the ophthalmic branch of the fifth, with which it communicates by several filaments, and by own were expectally which seems to join the lackreposed branch of the fifth, is next penetrates into the orbit by the widest part of the forguen levernow, and quitting the course of the ophthalmir, proceeds inwards to the superior obligar, in which muscle it is entirely distributed. Whilst within the cranium, and inclosed in the shearh of the dura mater, the fourth sends a filement to the tentorium of the cerebellom: this filament has a retrograde course. The dissector must follow the fifth pair from the point where it enters the foramen in the dura mater, over the depression in the fore part of the petrous portion of the temporal bone to the Casse-

rean ganglion.

538. The Figure Park, Trifucial or Trigewini, is composed of from eighty to a hundred filaments, and close inspection shows that these filaments are arranged in two distinct bundles,-a motor and a sentient; these were first described by Paletta and Wrisberg; passing along together, they reach the anterior part of the purs petrosa of the temporal bune, and are lodged here in a particular depression near its summit; a fold of the dara mater passes over the depression, forming a bridge underneath which the nerve passes; the nerve continues to increase in size, and its scation! portion soon expands into a ganglian, the ganglion of Gasser. All the filaments of this nerve do not pass through the ganglion; like the spinal nerves, the motor portion or roots pass beyond it to unite afterwards with one of its subdivislows, the exferior maxillary nerve. To observe this, cut through the little bridge of the dara mater which passes over the nerve, and clean its upper surface carefully; next mise it up from within outwards, and the unfor sunts discovered by Paletta will be found at first upon its inner side, and afterwards passing below it. These correspond to the nuterior roots of the spinal nerves. The ganglion of Gasser adheres very intimately to the dura mater. From its convexity proposed

three plexiform fasciculi, which, on being traced, prove to be the three great divisions of the neeve, viz. the ophthalmic of Willis, the superior maxillary, and the deferior maxillary; to this last proceeds the now-gan-

glionic roots of this pair of nerves-

539. OPHVILALMIC NERVE, By First Diction of the Trifacial. Trace this upwards, forwards, and outwards inclosed in the outer wall of the cavernous sinus, It there divides into three branches, viz. on external or lackrymal, a middle or frontal, and an internal or cussal; these enter the orbit by the sphenoidal fissure. 19. The Lackrymal Nerve is the smallest of the three divisions of the ophthalmie; it is difficult to truce this nerce at its origin; having entered the orbit, it proceeds along the upper surface of the rectus externos. traverses the lachrymal gland to which it furnishes twigs, pierces the ligamentum latum pulpeline superioris, and is distributed ultimately to the upper cyclid and skin of the temporal region. The lachrymal nerve in generally formed by two lilaments, one from the fourth pair, and the other from the ophthalmic division of the fifth. This will be best seen in tracing the fourth pair, which the student should slo at the same time that he traces the ophthalmic, thus taking care that the dissection of these perves proceeds together. 23. The Frontal Nerse is, properly speaking, the continuation of the ophthalmic, it enters the orbit along with the functh pair, and proceeding horizontally forwards between the periosteum of the orbit, and the levator pulpebrus superioris divides into two branches, an internal and an external frontal. The external fruntal is likewise called supra-orbitar; it leaves the orbit by the supraorbitar foramen, and divides into ascending or frantal hearehes, and descending or palpeliral branches. The frontal branches may be followed in the skin of the forehead, as high as the lambdoidal surure. The internal frontal, which raries in size, leaves the orbit between the supra-orbitar much and the pully of the trochleator muscle, hence called supra-trochlean and divides into ascending or frontal branches, and descending or mass pulpebral. It is presumed that all, or the greater number of the terminating filaments of these nerves proceed to the integuments. 30. The Agent.

Nerve is the internal branch of the ophthalmic. It ponetrates into the orbit between the two divisions of the third pair, crosses obliquely over the optic under the rectus superior and superior oblique muscle, renches the inner wall of the orbit, and subdivides into two branches, the sub-trachlear min proper nasal. The anti-trocklear branch follows the original direction of the perve, leaves the orbit beneath the pully of the trochlear muscle, (hence its name,) and here subdivides into three sets of branches, viz. palpebral, nasal, and frontal. The proper nasal branch follows a very singular course. It leaves the main trunk nearly at right angles, and penetrates the anterior of the internal orbitar foraming, and this leads it to the upper surface of the cribriform plate of the ethmoid bone, and consequently within the cranium. Its passage through this osseous canal to reach the interior of the evanium. may very readily be displayed by cautiously bying it open with a chiscl or strong knife; but the course of the nerve through the pase can only be traced upon a vertical section of the head. It next passes forward to the fissure in the anterior part of this plate, and descending through this fissure, penetrates into the masal fosse, and there subdivides into two branches, viz. nerve of the septum and nanolobar branch. The first is distributed to the segrum; the second proceeds to the integuments of the lobe of the nose, and to the surface of the turbinated bones. The assal branch is the nerve experimented on by M. Magendie, and seems in some way ar other intimately connected with the sense of smell. By the branch which it sends to the lenticular ganglion, it must also be in some way connected with that of vision. This branch will be more particularly described along with the ganglion.

540. The THERP PAIR of CREENAL NURSES commences in the crura cerebri, and is found afterwards to the outside and semewhat below the pasterior clinoid processes. It is here received in a sheath of the dura mater, which it perforates, and is said by some (Cruvillhier) to pass through the cavernous sinus. This is incorrect; the only nerve fairly passing through the sinus being the sixth; it divides previous to passing into the orbit, into two branches, a superior and an in-

ferior. Just as it is about to enter the sphenoidal for sure, it is said to receive from the cavernous plexus of the sympathetic, some very fine filaments, and one from the first branch of the fifth pair." At this point the sixth pair lies below the third, and the fourth and frontof branch of the lifth pair, allowe it. The musal branch of the fifth passes between its two divisions. The auperior branch of the third is much smaller than the raform; it passes immediately below the appearer rectos musele, and divides into a number of branches, supplying that muscle; some filaments proceed to the levator pulpebrae superioris. The infirme branch of the third pair backs like the continuation of the main tronk. It proceeds forwards and downwards between the optic nerve and the sixth pair, and almost immediately saledivides into three branches, of which one proceeds to the rectus internus, one to the rectus laferier, and the third to the inferior oblique. From this beanch, going to the laterior oblique muscle, there proceeds a short and strong filament to the lenticular gauglies. + We have thus seen that the third pair of cerebral nerves sapplies all the muscles within the orbit, excepting the trueldeator and rectus internus. Its supplying the obliques inferior, is remarkable, as proving that the musde cannot be an involuntary one, and yet it fornishes the necessary filaments to the levator pulpobra superioris muscle, acting throughout the whole day, altogether without our conscionment, and therefore in this sense involvatore.

541. Starm Pain of Centuleau Nerves, or diduceus Ocali, supplying the rectus externos muscle, which directs the globe of the eye and its and outwards, arises from the fissure which appears the rachidian bulk from the pons Verallis; each ocreat its commensument so as compassed of two roots; the nerve after penetrating the dura mater at the side of the lossilar growse by one or two spectures, proctraps, the cavernous signs. Whilst in the sinus it

^{*} I have never men there than entities in I believe that the third pair power through the cavirous alone, in the affect scans of the term.

^{*} This filment is generally, but not always tamages than that which the purpless resilies from the month.

crosses the internal curotid artery (also inclosed in the sinus;) communicating also with two branches of the sympathetic system of nerves, thus connecting it to the superior cervical ganglion; it is next leaves the sions and penetrates into the orbit, through the forance blocerum, gains the ocular surface of the rectus externes muscle, and is distributed wholly to it. The uses of the nerve are obvious, but physiologists have hitherto offered no explanation of the singular want of sympathy there is between the nerves and muscles of the two orbits, as proved by the simultaneous direction of the six of both eyes towards one object. The student will find it more convenient to trace the branches of the sympathetic which communicate with the sixth pair of eratheric which communicate with the sixth pair of era-

mid nerves at a later period of his dissection.

542. OPHTHALMIC OF LEXTICULAR GANGLION. This ganglion may be reached in several ways. 15 By tracing the branch it receives from the most branch of the ophthalmic; this is the most difficult method; 2. By following the branch, it receives from the inferior division of the third, more especially from the branch the third furnishes to the inferior ublique muscle. 3º. By disserting cautiously in the fut situated between the rectus externus musele, and optic nerve. The ganglion so found, is also called lealicular; it is a small grevish body of an irregular shape; by its two posterior angles, it receives the filaments from the nasal branch of the ophthalmic and from the third; and from its autorior margin it sends off the ciliary nerves. Finally, the ganglion reprives, directly or indirectly, a very fine filament, which is senrely ever attended to, from the cavernous plexus; but this more generally joins the ussal. The ciliary nerves compose two fasciculi, the superior composed generally of four filaments, the inferior of five or six, they run along the surface of the optic nerve, are dexuous, do not anastomuse with each other, and finally reaching the tunica scleratica, they pierce it to reach the space between it and the choroid tunic; pusing along this, they

In the horse, and more rurely in man, I have error a branch of the sympathetic so it extract the sixth, suddenly expecte, and passing around it, proceed so the first division of the fifth

proceed to the irin and also in the annulus albus. To follow them to their fermination, let the student remore the selectic and cornen. The most branch of the uphthalmic usually sends off a ciliary branch or two distinct from the others.

543. Lachriyman Gland and its Deers, Tonica Confederiva, Parpensie, Penera Lachriymania and Duers, Lachriymanic Sac and Nasar Deers All these parts may be readily made out on one or other of the orbits just dissected, with the exception, perhaps, of the cyclids, which will have been detacked from the margins of the orbits during the previous dissection.

544. The Exectos (Palpehras) are two in number, a superior and an inferior; these are borizontal. There is, bowever, a third or imperfect eyelid, (the vertical eyelid or seculrage nicitiess), connected with the tunion conjunctiva; this will be described afterwards. In the crelide, we have to consider their form and or ganization; their dissection consists merely in reflecting the layers of which they are composed, successively. The apper cyclid is possessed of great mobility, descends below the transverse diameter of the eye; chiefly closing the eye-Both cyclids are convex before, and present a number of transverse wrinkles, particularly distinct in ald age-The two eyelids are united at the extremities of the transverse diameter of the orbit, forming two angles (conthi), the inner of which is more open than the outer; this difference arises from the fibres of the orbicularis palpelstarum being inserted internally upon a tendon which does not exist at the outer angle. The free edges of both eyelids are in contact with each other, and supported by a fibro-cartilage. That of the upper cyclid is directed downwards, while the other looks upwards; they are cut obliquely from before backwards, and are so disposed as to form, on being brought together, a narrow and triangular canal, of which the ball of the eye constitutes the posterior wall. This canal is broader internally, especially apposite the puncia lashrymalia, than externally; it serves to conduct the trars towards these miffices during sleep. The free edges of the eyelids are concave and rounded over an extent of two or three lines on the aide next

the nose, where they correspond to the caruncula lachrymalis. When they begin to be cut obliquely, there is observed a small tubercle in which is placed the orifice of the lackryssal doets. There also, they change their direction, become nearly straight when the eye's open, and present on the side next the eye, as far as the outer angle, a row of small holes which are the excretary orifices of the Meibomian glands, before which, near the skin, is a series of hairs named cilies. The cilia, or eys-basies, are hard and solid hairs, arranged in two or three rows. The skin of the spelids is peculiar in its extreme delicacy and transparency; it is applied upon a layer of lonse cellular tissue, never charged with fat, but espable of being filled with serosity with extreme facility. The maximum layer of the cyclids; is formed by a portion of the orbicularis palpebrarum. The fibrows wembrane of the cyclidae xists behind the muscular layer, from which it is separated by cellular tissue, and occupies only the external part of each eyelid. It is usually called the ligamentum latum palpebrae superioris, and was long ago shown by Winslow to be derived from the periosteum of the frontal bone and orbit. The portion which belongs to the upper eyelld is placed between the orbigularis muscle and the expanded aponcurosis of the levator pulpeline; that of the lower eyelid is immediately applied upon the tonica conjunctiva. These two portions have their fibres mutually interlared, from the angle of union of the tarsal cartilages to the outer angle of the orbit, and proceed from thence to the corresponding part of the circumference of that envity, as well as to the edge of the cartilages, diminishing progressively in strength and thickness, so as to be substituted internally by a lamellar tissue loaded with lat. Apertures are observed in several places of it. for the passage of nerves and vessels. Moreover, the upper evelid presents a second fibrous layer crossing the direction of the above, which is constituted by the aponeurosis of its levator muscle which attaches itself to the corresponding fibro-cartilage. The Tarsal Fibro-Cartilages are two small laminas placed in the substance of the free edge of each eyelid, on the same level as the filmous layer. Each of them commences at the bifurested extremity of the tendon of the orbicularis mus-

ele, and terminates externally, by uniting with its fellow opposite the crossing of the two fibrous layers. They are broader in the middle than at the extremities, and differ in their form as well as size. The upper is larger, about six lines broad, very contracted at the two ends; the lower is two lines in breadth, and presents nearly the same dimensions in its whole extent. Their autorior surface is convex, and is in connection with the orbicularis mancle; the posterior is concave, lined by the tunica conjunctiva, and marked with several vertical grooves, which lodge the Meibomian glands. Their adherent edge gives attachment to the fibrous layer of each eyelid; but in the upper eyelid it is strongly curved, and affords insertions to the lovator muscle, while in the lower it appears rectilinear. Their free or villary edge is broad and thick, rounded, and slantingly cut. These two tibro-cartilages are rather thin, flexible, elastic, and of a slightly yellowish tint. but present authing peculiar in their structure. The Tenme Tarri muscle connected with these tarsal cartilages, has been already described. (422). The Methanian Glands or Citiary Follicles, are small round follicles, lodged in particular grooves, between the tarsal cartilages and the tunies conjunctiva. They are disposed one above another, in such a manner as to represent two vertical and parallel lines of a yellowish colour, more numerous and more distinct in the upper eveld, where there are thirty or forty, than in the lower, where they are only about twenty; they communicate with each other, and those nearest the free edge of each systial open externally by minute prificedisposed in one or two rows on the side next the eye. behind the cilie; there is nes from them a solucions humour, which, on pressing the tursal cartilages, may he aqueezed not under the form of extremely minute evlinders.

545. The Lacrinvial Grands occupy the outer orifice of each orbit, and correspond to the lachrymal fossowithin the external angular process of the frontal hom-Their use varies. Above them is the periodesian of the orbit, and here they are convex; by their concave side they rest on and adapt themselves to the surface of the eye-hall. The Inchrymal gland is composed of a

number of lobules connected by collular tissue, and separated from each other by vessels and nerves which crosp in their intervals. These lobules are formed of rounded granulations, of a reddish white colour, in which the last ramifications of arteries terminate, and in which the radicles of the veins commonce, but whose more intimate structure is still entirely unknown. It is presumed that from each of them issues a small exevenery canal, which by uniting with others in its vicinity, gives rise to trunks sumpwhat more distinct-Anatomists who have seen and injected them, statethat they are six or seven in number, and open, internally of the upper cyclid, at some distance from the nuter part of the corresponding tarsal cartilage; their orifices are seen upon the conjunctive, where their series forms a curved line, the convexity of which is directed upwards and outwards. The capsule of the gland is fibro-cellular, and it sends partitions into its substance. The prifices of these ducts are very evident

in the lower unimals, as in the dog.

546. The Tunica Consunctiva (Membrana adhato), belongs to the order of mucous membranes; thin, transparent, and lines the posterior surface of the evelids, and the fore part of the ball of the eye, but nocording to Ribes, limited at the circumference of the comea. On the free edge of the upper eyelid, it is continuous with the shin, where the cilie arise; it then covers the edge of the fibro-eartilage, and is perforated externally by the orifices of the ciliary fullicles. Internally, it introduces itself by the superior punctum lackrymale into the lackrymal duct, proceeds behind the fibre-curtilage and the aponeurosis of the levator palpebra musele, is reflected over the seleration, to gain the posterior surface of the lower cyclid, and terminates upon its free edge, where it is continuous with the skin, and dives into the inferior lachrymal punctum. On leaving the evelids to be reflected over the eye, it forms a seminircular fold, which corresponds to the fat of the orbit. On the internal part of the ball of the eye, the tunica conjunctive forms another rather indistinct fuld, named the membrona victitions, or vertical evolid, because in man it seems to be the rudiment of an organ of the same name, which is highly developed in certain animals. It is rendered apparent by turning the eye towards the nose. Mr. Merkel supposes that there is a small cartilage in it, even in the buman structure. The inner surface of the tunina conjunctiva is attached to the eyelids and ball of the eye by dense collaboratisme. The nuter surface is smooth, constantly moist; when the eyelids are closed, it corresponds to itself in all points; when open, it is in part exposed to the contact of the air; it contains a number of capillary bland-vessels, especially on the cyclids. Its arteries are derived from the upbthalmin artery; it receives minute filaments from the lackrymal nerve and external nasal.

547. The Caruscula Lagrangianis is a small reddish tubercle, of a pyramidal form, situated in the inner angle of the cyclids, at the fore part of the ball of the eye, behind and within the paneta lachrymalia. It is a mass of small mucous crypts, invested by the conjunctive, which forms anteriorly and externally of them a semilunar fold (sucubrana vicidians). Each of the orifices of these crypts is furnished with hairs of excessive delicacy, and visible only by the microscope. They receive filaments of the masal nerve, and some vascular ramifications. Use, to retain the tears in the inner angle of the eye, and furnish a peculiar schaoons thind.

548. PUNCTA LACHRYMANIA and DUCTS- The Peneta are small apertures, occupying the centre of a small tuberele, slightly inclined backwards, and situated at the distance of about a line and a half from the internal commissure of each cyclid, at the place where their edge changes its direction. A small mucous rimsurmands their circumference. They are placed opposite each other; that of the lower cyclid is directed unwards, outwards, and backwards; that of the upperdownwards, and also outwards and backwards, so that when the cyclids are closed, they only touch each other on the side next the skin. These puncta are the external orifices of the lachrynnal duets which carry the tears into the lachrymal san, through the evelids, and whose Counster is longer than the circumference of the puncta lachrymalia themselves, which makes these canals appear slightly contracted at their

origin. The lachrymal duets are distinguished into superior and inferior, according to the cyclid to which they belong. The superior linkrymal duet, which is longer than the inferior, ascends at first vertically, then bends nearly at a right angle, and proceeds inwards and downwards along the inner part of the free edge of the cyclid, immediately beneath the conjunctiva. The infersor luchrymal duet also at first descends nearly vertically, then directs itself inwards, ascending a little to plane itself beside the superior. Opposite the commission of the cyclids, both proceed alongside of each other, behind the tenden of the orbicularis pulpehrarum, as far as the lachrysmal sac, into the middle part of the natur side of which they open separately. These duets are formed of a delicate prolongation of the conjunctiva, which is thus continuous with the mucious moniferanc of the lachrymal say; are wider generally than the puncta. The passing of bristlealong these ducts into the lackrymal sac should be

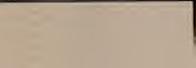
frequently practised by the student.

540. The LACHRYDIAL SAC is a membraneous bug. looged at the inner angle of the orbit, in the channel furmed by the lackrymal bone and the aspending processes of the upper maxillary bone. Its form is evoid: its outer side is covered anteriorly by the akin, the orbicularis palpebrarum, and its tendou, which divides is transversely into two portlans, the lower narrower and more elongated than the upper. Posteriorly, it curresponds to the caroncola lackrymalis and engianetiva, and furnishes some insertions to the inferior oblique muscle of the eye. Its inner side fills the lachrymal groove, to which it is closely attached. Its apper extremity is dilated and rounded. forms a prominence above the tendon of the orbicularis palpebrarum. The injerior extremity is continuous with the nosal canal. In its interior, the sac is lined by a mucous membrane, continuous with that of the eye and casal fusion. It is always covered with mucus. At the reterior, the lackrymal sac is formed by a fibrans aponeuratic membrane, which some consider as the refleeted tendon of the orbigularis palpelirarum. This membrane is white, dease, and strong, hard on all sides to the buny edge of the lackrymal groove. Antoriorly, it is united to the rendon of the orbicularis pulpebrarum and to some of its fleshy fibres, to which

it gives intertion.

550. NASAL DUCK, Lay open the sac from the tends-seall desawards; and pushing a blunt probe into it in the same direction, will thus shew the course of this duct. By looking into the inferior mentus of the nose, the student will abserve the extremity of this probe, indicating the course of the tears. The concourpart of this canal has already been described (80). It is fined by a prolongation of the mucous membrane of the luchrymal sau, which adheres feelily to the periexterns, and opens, by a contracted order, under the inferior turbinated hone, which is furnished with a circular fold formed by the pituitary membrane. The inferior arifice of the nasal duct may be reached from the anterior nostrils, by a firm instrument, such as a portion of brass wire, having the curve of a common anourism needle. It is not usual to expose the mucous membrane of the duct, or indeed any part of its course, but this may be done either by chiselling off the corresponding nasal hone, and a portion of the upper maxillary, or from within the nose, by removing the anterior extremities of the inferior and middle turbinatual bones.

551. THEFAULAL NERVE. The fifth pair of email nerves. Of the three great divisions into which this important nerve has been divided, the pest has already been described (508-9); the second and third divisions have also been repeatedly alluded to, and their minute anatomy may be completed on the same head and neek on which the student has been examining the muscles and other parts; but if the stadent's object be calely that of the anatomy of the trifacial nerve, it were better that he commence his dissection on a freels part; and as the dissection is tedious and difficult, the head and neck must be separated from the trunk. A vertical section carried a little to the mesial line, so as to leave the votaer entire on one side, will enable him out only to display, but examine minutely, the trifacial in all its subdivisions, and this may be premoved in week alcohol for any length of time, for after reference. In the dissecting room, it is necessary how-



its inferior wall, subdivides into two branches; a lackeymal branch enters the lackrymal gland by its lower surface, and anastronoming with the luchrymal branch of the sphilalmic nerve, (a branch of the first great divition of the trifacial nerve,) sends some filaments to the upper eyelid near the external angle-The temporowalur branch proceeding forwards, penetrates the malar foramen, and subdivides it into a malar filament which passes through the home to be distributed to the integaments of the check, and a temporal filament which traverses the orbitar portion of the same malar boxand plunges into the thickest part of the anterior surface of the temporal muscle, where it anastomeses with the auterior deep temporal nerve, a branch of the inferior maxillary. After having furnished the orbitar nerve, and whilst it is still in the spheno-pulatine feesa, the superior maxillary nerve gives off from its inferior margin a large branch; occasionally two and sometimes even more, from which proposed immediately a great number of diverging nerves, viz. the three polatine nerves, the sphempelature and the online : At the point of divergence, or where these nerves are leaving each other, there will very generally be found the speno-palatine ganglion, or ganglion of Mockel, which, although not always present, it is usual to describe the following nerves as coming from the ganglion. They very generally arese directly from the superior maxillary nerve itself. P. The unterior, middle, and posterior pulatine, easily. transd, proceeding from trank to branches. The outrvior or great palatine penetrates directly into the posterior palatine canni, which it passes through, and terminutes upon the vault of the palate. In its course it formishes an inferior muscal twig to the middle mentus of the nose, and to the middle and inferior turbinated Sones,-some filaments which pass through the igner wall of the maxillary sinus, and proceed to the last molar textls. A strong branch to the velum palati .its terminating branches are plunged deep in the midst of the glandular structure of the palate; these perves, my doubt, proceed ultimately to the mucous membrane of this pare. The middle and posterior palatine enter caseous casals, peculiar to each, and proceed to the musal surface of the velum palatic. The next branches to be followed are the pasterior agral or spheno-palatine.

These must be examined upon a vertical section of the head and face, such as we have already directed to be made, and they can be seen only upon such; they are very small, and penetrate by the spheno-palatine forumen into the masal forme; they were described by Scarpa with extreme care; they will be found chiefly between the periosteum and murous membrane, and to trace them fully and properly; the preparation must have been placed for some time in nitric soid diluted. with spirits,-they proceed to the septum, and to the outer wall of the nasal fossa, and have hence been divided into internal and external branches. nerves were supposed by M. H. Chequet to proceed forward, and to terminate in a ganglion in the anterior pulitine cunal, but this anatomy has not been satisfactorily made out. The Vidion or Pterugoid nerve promeeting backwards from the ganglion of Meckel, almost immediately enters the canal of Vidios, and traversing it, reaches the foramen lacerum medium and eartilaginous substance which fills up this furamen. By reverting now to the inside or cerebral aspect of the basis cranii, and cautiously raising up the Cassarian ganglion, and that part of the fifth pair lying between the ganglion and the brain, and opening with a chisel ar strong knife, the vidian canal through its whole length, it will be seen that the vidian nerve divides into two branches,-a superior or cranial, and an inferior or carotid. The inferior descends along the carotid canal and cannot be very easily followed at this stage of the dissection, it proposals to join the superior cervical ganglion. The superior branch of the vidian may now be traced across the foramen lacerum medium, gradually gaining its upper surface, until it reaches the Highes Fallopii, it joins the partia duce of the seventh pair in the canal of Fallopius, and anastomoses with it, a fact. which we lave maintained and taught since 1821. According to some, therefore, this branch of the vidian stops here, but others think that it proceeds alongside the portio dura for a short way, so that the two nerves he together in the mual of Fallopius; it is then sopposed to leave the partie dark by an opening lending into the cavity of the tymponom across which it passes, and here receives the name of the cords tympani, thus formed by the upper branch of the vidian. The carda tympani leaves the tympauum by the fistare of Glaser, and shortly afterwards placing itself upon the lower margin of the nerves gustatorium, proceeds to the sub-maxillary ganglion, as has been already deerribed (473). The disputed point in the course of this nerve, vir. where it is supposed to follow the portio dura in the Fallopian canni, cannot be well seen at this stage of the dissection, but the cavity of the tympenum should be displayed by taking off the plate of bone forming the upper wall; where the vertical and petrous portions of the hone meet each other. In the cavity of the tympanum, will be found the corda tympani, and the further progress of the nerve is very readily traced by a reference to the nerves gustatorous (478), upon the lower margin of which it will be found, and may be followed apwards to the fissure of Glasser, and downwards to the sub-maxillary ganglion. A reference to the dissection of the car and of the portio dura, will explain to the student how he may examine that part of the nerve, which is supposed by M. Chaussier and others to lie in the Fallopian ennal, but of the anatomy of which we have never felt satisfied. The Posterior Alugolo-destar nerves, two or three in number, detachthemselves from the superior maxillary nerve, sometimes by a separate trunk, sometimes ingether, just as the trunk itself is about to enter the infra-orbitar conal. They descend over the maxillary tuberosity, furnish some branches to the buccingtor, and next enter ussome canals, hollowed not of the superior maxillary bone. The inferior branch is the larger, and like the upper is contained in an osseous canal below the tuberosity, and both supply the pulps of the small and large mular teeth. The America Alecclo-dentar is sent off from the infra-orbitar whilst in the canal, and descending in a canal peculiar to itself, supplies the pulps of the incisive, canine, and first molar teeth. The Terminating branches of the inferior muxillary nervo have been already described; they escape by the farances intru orbitule upon the face, and spreading out in all directions, supply the integuments. These branches may be divided into paipebral, susal, and lablal branches, Finally, by uniting with the portio dorn, they give riso to the sub-orbitar playus.

553. The ISERRIOR MAXILLARY NERVE is the Third

great division of the Trifacial. It may be dissected either from the outer side, or from the inner side - the preferable way is to do both. Upon its outer side the following dissertion will display the deep tengeral, seasseteric, bureal, internal phrygnid, and anriculo-temporal brancher: out through the zygomatic arch, reflect the masseter musels cautiously as far as the sigmoid natch, saw through the coronoid process at its lase, reflect from below upwards the temporal muscle, and cautionsly divide the pterygoid muscle, as the buccal nerve passes through it. By disserting from the laner side of a vertical section of the head and face, the student will most readily trace the cordo tympani, the olic ganghow, and the origins of the other branches of the interier maxillary nerve, vix. the lingual, dentar, and even the branch to the internal pterygold muscle. Commence the dissection by examining that portion of it which lies within the granium. It is the largest division which comes from the Casserian ganglion, and it is to it that the motor branches of the fifth, discovered by Wrisherg and Palletta, attach themselves. These motor branches do not pass through the ganglion, but join the inferior maxillary intimately after it has passed through it. The nerve thus formed is evidently composed of two divisions, distinct physiologically, but not anatomically, viz. a motor and a sentient part. Both pass together through the foremen neale of the sphenoid bone. By entting away the base of the granium upon the inner or mesial side of the bone, the ofic canelion placed across the trunk of the nerve will be exposed, and in the course of the proceeding dissection, the seven branches of this complex nerve, or rather division of the trifacial. We shall first describe the branches, and next the ganglion, which is less certain. The branches may be urranged in this way :

	Anterior and profour				ral,	1
1º. External.	Masseteric	3	-	-		3
	Buccal					1
2º. Paterior.	Auriculo-temporal	8		3	-	IA.
3º. Internal.	Internal Pterygoid	-	4	*	1	18
4º. Inferior	Lingual		+	-	-	1
4 . Adjustus.	Dentar + 1 .	-3	96			2
						-

15. The Profound Temporal will be found between the upper wall of the avgomatic foses, and the external pterygoid muscle. Having reached the crest of the sphenoid which separates the temporal from the plerygold fosse, it farms a sort of plexus with the buccal and messeteric branches. The filaments from this prooced to the deepest layers of the temporal muscle. The Musselevic Erranch arises at the same point as the preceding, but is larger, proceeds directly backwards and outwards to reach the sigmoid notch of the inferior maxillary, and enters the deeper layers of the mososter muscle. The Bucon-Lubial Branch is large; it truverses, by two or three branches, the external pterygold muscle, which rounits on passing through the muscle. It next descends between the coronnial process and maxillary tuberosity, gives filaments to the external pterygoid, gains the level of the posterior part of the buccinstor muscle, and spreads out in a great number of branches to this muscle. Many anatomists think that these branches may be traced chiefly to the mucous membrane of the month. 2". Auricola Temporal Nevec, (posterior branch of the inferior maxillary nerve) may be exposed by removing the condyle and neck of the lower jaw, behind which it is placed, only dividing with a saw the neck of the bone, and forcibly raising up the condyle. This branch is very large at its origin, is deeply situated, anastomoses froely with the portio dura in the substance of the paretid. and finally is distributed to the integuments of the external car. 3º. Internal Ptergered nerve (internal branch of the inferior maxillary nerve) distributed to the internal processed muscle. This nerve will be seen best in examining the air ganglios on which it always has appeared to us to be placed. 4". Lingual or Gualatory and Denter, are the terminating branches of the inferior muxillary nerve. The lingual or gustatury is situated at first between the external pterygoid muscle and the plaryny, next between the two pterygoids; afterwards between the internal pterygold and the ramus of the lower jaw, it next proceeds from behind forwards, along the upper margin of the submaxiflare gland, between the gland and the mucous membrane of the mouth, ahave the mylo-byoidens muscle, then

under the sublingual gland, which it crosses to reach the corresponding edge of the tongue, into the thickest part of which it penetrates. Whilst passing between the pterygoid muscles, it receives the branch called the Cords Tyongard, which farms with it an acute angle. We emissiler the corda tympani as merely a branch of the facial, but as we have already said, many esteem it to be the cranial or superior branch of the vidian. Upon the inferior margin of this nerve on a level with the sub-maxillary gland will be found the oric ganglion. This ganglion is connected by several filaments with the lingual, and sands off several to the glands and other parts; but the main trunk of the nerve itself also sends off several branches to the gland. In the tangue, the lingual branch of the fifth, which we have thus traced, communicates with the hypo-glossal, or ninth pair of nerves, and may finally be traced to the uerrous papille of the tongue. Usr -It had always been estocated the gustatory until ately, when this function has been called in question by Panizza. The Inferior Dentar Nerve; larger than the lingual, descends with it, at first between the two pterygoid muscles, then between the internal pterygoid and the ramus of the lower jaw; here it is applied close to the bone hotween it and the internal lateral ligament of the joint; it next enters the posterior opening of the inferior dentur canal which it traverses along with the inferior dentar artery, protected by a fibrous canal; it furnishes as it goes along filaments to the large and small moles teeth, and reaching the foromer menti, passes not by it to the integuments of the lower lip, having proviously sent forward a branch along the continuation of the canal which runs below the incisive teeth. The pulps of these tooth are supplied from this branch. The inferior dentar, just believe it enters the dentar canal, sends a branch to the mylo-byold muscle.

555. The Oric Gasacron. We have already explained how this gaughton should be exposed. M. Arnuld has given the following description of it. "Situated immediately beneath the forames ovale, and upon the internal side of the inferior maxillary nerve at the spot where the smaller portion of the trifseial, (motor faciousles of Palletta) unites itself to the other filaments. Externally the ganglian is covered by the cartilagianes part of the Bustachian tube, and by the origin of the circumflex muscle of the palata; behind it unites the middle meningeal artery. Its external surface rests against the inner side of the third branch of the fifth." The connexions and anatomy, as stated by Arnald, are, a branch to the glasse-planyageal; a branch or branches from the inferior maxillary; a connexion with the sympathetic. Branches proceed from it to the internal muscle of the malieus, and to the circumflex muscle of the palate.

PART IX.

OF THE NERVOUS SYSTEM.

206. But our proceeding with the discretion of this important system, the following brief granul constructions may be useful in the student. The entire persons system may be decided into two great divisions. The entire persons, the besin, and spinal correction. The fore division or rentral partien, is further subdivided non-the construction of the construction of the students, and form anatomically have different functions. They are all others, and form anatomically have different functions. They, many commence the study of these organs with that of the spinal marrow, and from that proceed to the break of the spinal marrow, and from that proceed to the break of the spinal marrow, and from that proceed to the break. The retrone centres, are profested by, 1°, an occount of the data students of the spinal marrow, and from that proceed to the break of the continued of the spinal marrow, and from that proceed to the break of the spinal marrow, are from that proceed to the break of the continued. The retrone and quied effects. The file of the continued of the spinal turner, the grant marrow, the creation of the pinal material.

Aby, Manusca. Setting a series are rest Manuscases. As soon after the dissection of the number of the back as possible, the scalars attracted place the subject us its face, and lay open with object, saw, and mailet, the spiral excell, taking care not to injune the parts within. This is best done by placing an elevated block ferlow the middle of the chest and upper part of the abdomen, as as in pages it to arch much backwards; and applying a

any, obliquely inwards to the lattice of five or six of the flored vertebra, remove these lamines together with their spinous processes. As soon at this is done, the statent may precised to by open the entire earnal, from the extremety of the scenam quite to the head, and even removing the pureries part of the occupied bane. This section will expens the spinol macrow enclosed by its membranes.

508. The Servat Poetros or voy Duna Maren is a long. filtrous, cylindrical prolongation of that parties of the flow mater which is within the remium, extending from the foramen magnum of the occipital bone, to the termination of the carel of the mercan. The expanity of the spiral parties of the data mater is much larger than what is required by the segment contains. This may he shown by injecting a fluid into it, which, by dispension, shows a considerable unlargement in the rervical region, and another in the lander region. It terminates interionly by subdividing into several shoulds enclosing the sacral pervey. The reason assigned by Column for the great capacity of the spinal portion of the case conter to that it contains a " seroes Equid." This is called the liquid of Committy, respecting the sectors of which many interesting experiments have hern made of late years by M. Magundin. The ceternal english of the spiral portion of the data mater posteriody severely adheres to the coverns and ligamentous surface a net-mork of veins surrounds it, preventing commet with the inside of the lamine verybragum and the reflow Egaments; the will spaces are filled with a fluid redfish fat, internangled with small yours, and infilmted with signity. This fit resimbles the marrow of the long broses. On such side the dura motor farrishes short sheaths for the spiral nerves passing with them through the forances runjuralia, and then mingling with the summaling callular substance and perfections. Anteriorly, the fare mater other-more ficulty to the posterior common ligament of the vertebra by filenes prolongstime ; this can only be seen towards the close of the dissection when the student proposes removing the spiral marrow and the membrane from out we comme rose. Lay upon the dam mater by an incestion from the upper quite to me lower part. The laterand surplies is smooth and framed, which is away to the layer of the acadmaid membrane savesting closely its oner surface; they cannot be separated in any extent by dissection. On cuch side may be seen the double extinces of the filmers canala giving passage to the anterior and posterior main of the spiral nerves-The edges of these openings are quite smooth as the amelianid pusses in a shart way along with the nerves. Inferred; the duramater extends quite to the extremity of the sample and, and consequently much beyond the extent of the spinel marrow. Sepaenorly it is intimately united to the base around the edge of the former magnam, and is there continued into the average of the

Quality of waters specified once regimen directions of metaling spinsons, id came plants often arraper est; non metality quality spatial versalities incglingly non-risks vaporous, sed aque, the p. 11;

remains, where it becomes the morbial data mater. The vessile of the spend data mater come from the adjoining ourse; as newes have yet been excell to it, it is incomities under the knote in living animals, but is said by M. Crurcillings to by sensible

when teem

550. Streat Anacuscon. This, less the spinal dura mater, is a continuation of that within the cranium. It is enoughed of two partiers, a periotel portion and a visagrat. The parietal larger musts intimately the inerr surface of the dominater. It is not things with the visceral partian by the shorth which the latter farmishes to the spiral nerves. The viscocal layer is an estremely delicate serous sheath, much more capacious than the spinal marrow it envelopes. It is also prolonged sround the eards equing and fumishes to early pair of nerves a basuel-shaped sar terminatone on a level with the feramon conjugalit, and is there reflected upon the dark mater, and thus the viscoral and paneral layers of the analysis are continuous. Between the spiral marries and its viscoral layer, there exists a completable interval, or at least a large space may be Surned by blowing air between them, or by the injection of a liquid. In this respect the uploal araclamed inflers much from the cerebral; it is so this sub-ameleood apare that the liquor Commit is found. The visceral layer, however, has certain connexious with the proper meantrant of the spinal marrow by maure of long filaments of a securingly fibrons nature. This made of connection takes place also at some points of the cerebral amounted, but out umformly so. It may also be the served necessitally that the two layers of the spinal amplitude aftern by a sumfer of points to each other; these are not bound as the revelopal evactoreid. The sub-graphonid liquid tiles the space between the viscoral layer of the amelianid and the plareater; at is found as well within the cruminum as within the spiand rangl. The existence of this liquid was known to Haller, lat most electly designated by Catman's many interesting raperiments have been made on it by M. Magendie. By opening the dura mater in the hunder region, from hear to free comoss of a clear limped fluid may sometime the entiretiet. There can be bittle nauto that the paretral sub-arachanid Equid paramunicans with the spinal liquid, but a question has arrest. Does the liquid of the vertricies of the balls committed: with the spiral ab-ameliand liquid on the bettern of the fourth ventriels or essewhere? I have slways enoughined the opinion that there exists an enougheation between them. Tieferenn also, no believe, denies this roosmentration. The was of the arashmid mentrate resemble those of other serous merulaways; it labolishes the surface of the bosin and seined marrow. The uses of the subsarrohmod liquid are not well known | when evertured in the living orienal by opening the spinal carely it appears for a time as if stapifled and as if inimplicated. But it onto recovers from this state,

500. Special PLA MAYER. This is a continuation of the combril per many. but it differs from it in some respects. It faclers named by some the sections of the spinal marrow. It is eatily expended, but it is difficult of demonstration, in causequence of its first affection to the spiral marrow, and the software of the organ to which it offices. The spinal morrow eight to he quite fresh, but this the student cannot expect if he has already taken time to dissect the mucies of the back. In new torn children also, the membrane we now speak of is pretty coolly domonstrated. The proper or investing membrane of the mechalis spinulis is usually considered a filtrois membrane of some resistmer suspecting the medalla, as the neuroems does the nerves. The external surface is summarded by a vascular net-work, remarkable for its thexpositions; at penetrates into the thickness of the membrane. In other respects the membrane is of a dull yeslouish colum, and even a few black points may occasionally be aren upon a. By its outer surface in affarers by a few illinous points to the usecral layer of the araclmoid; its connexum with the mentile is cellular and vascular. In the line of the anterior median fissure it forms a displicature which penetrates to a cursiderable depth is a slingle posturization of extreme tenuity passes isto the posterior median fissure. The terminating and or filement of the spiral marrow is generally considered merely as a prolongation of the proper mentionee. It is strong and habitually teore, and seems intended to keep the spiral works in its proper position. Next examine the Linuxeanus Destatum Tris is so named both from its functions and from its findled appearance. It is a delicate fibrous lamins extending throughout the while length of the medally spinsis, adhering by its hore to the paper membrane of that organ, and sending and from its freemargin touth-scaped processes which adhere by their summits to the oner side of the data water covering of the spinal commun. The first of these may be seen at the sides of the formum magsum overpitie, between the vertebral artery and the hypo-glossed nerve; the last, which is the prentieth or twenty-first, to the tersaluation of the rigament and corresponds to the termination of the medulla. It separates the spinal acryss from each other, and retains the medalla in its place.

so a white apprenticed tylinder of nervous matter, streated in the spine canal, and accupying its separate parties electly; it is continuous with the cannal pertine of the nervous system, diameted within the cannal pertine of the nervous system, diameted within the cannal pertine of the nervous system, diameted within the country is usually called the nervous margin of the first lumber vertabra, or middle of the scened. Its discontinuous carp in the adult from filters to righters under ; its absolute to both has been supposed by some to be in the direct ratio of the sold activity of the around; they for, however, we extremely warms. In respect to the descriptions of the relativity of the around produce to the telescontinuous of the relativity of the around; they for, however, we extremely warms. In respect to the description of the relativity of the common relativity of the country that the contract of the spiral macrow and heart, and the relation that neither regar produces the when, and thus in respect to their

growth they are strictly independent. Proportionally to the weight at the body, man is suppress to have the largest spiral marrow. It differs also in volume in different parts of its course, being somewhat larger in the especial region, on a level with the third cervical verteles, and as far as the second dorsal; it bere contracts considerably, and thus entitions as for as the eleventic thosal, where it may may enlarges, but again suddenly contracting, forms a cone, which beminutes by a first cord controlled amongst the nerves constituting the result squine; this used is semi-transparent, seems classic, throne, and firm a rein constantly accompanies it. The rord may be followed as far as the first encoygeal hore." Viewed automorly, may be abserved the auteriar motion flaure; posteriorly, a similar saw, has scarcely so distinct, although some assert it to be deeper than the ante-On each side these fissures are soon the mots of the anterior and posterior spinal nerves. By pulling out a few of these roots of the nerves, Chansier endouseured to show lateral fiscures; there are no lateral funces. The immedate investing membrane of the spinal marrow has been already described; it differs somewhat in atructum from the rereheal pin mater, in having a fibrous appraisance. The investing membrare must now be carefully stripped off, (the roots of the nerves coming with it,) which can only to done in very fresh subjects. Next examine the anterior commissione: this is at the buttum of the asterior medica fiscure, and is cribeifigum; the perfuntions are caused by the passage of numerous blood-vessels proexcling into the interior of the mobilis. The estimissing a generally considered merely a metallicey lamins. When stratemists say that there are two medullas, they can only me the linguage in the same sense as they scould speak of the hmin. The pesterior media fluore is dropes than the anterior; it is extrymely narrow, and in the bestion of it may be seen the cineritions substance of the metalla esimila. The following turds have been admitted to composing the spoul marrow: two posterior median excessively ampow, arrest on either side of the posterie metian fissire; two posterier lateral, compressed between these and the must of the posterior nerves; two activities lateral, comprising all the remaining pure of the medulls, on far as the america flavores. Are there any strictly laural mode or factions amated between the easener and posterior mots of the sound nerves? This is very similarish. Interior structure.- It results from a careful insportion of the structure of the medalla spinslik that it is mingosed of two large lateral cylinders of the white nerveus matter anclosing the grey or cinerimose. The mark if represents tolerably well the unaugment of the interior when cut orrors. Little is known further than this of the procise structure of the spinol marrow; many consider it to binum

M. Crereditio upp, if endeant proper is more destroir, on or be open as unfamilie, zero is data metal, and. But the electromach is decimally expension.

and leminated, each force and cach lamina being independent of each other, and extending throughout the whole length, but their descriptions are far from Being distinct. Provious to the fourth month in uters, there is a cavity in the centre of the modula spi-

mains, but this morally disappears before birth.

502. The Brais and its Memmanus. When the student has made up its mind to dissect the brain and its membranes, he ought to proceed as early as possible, to open the head by a vertical incision carried from the root of the near, over the vertex, to the external occipital proteinemes, through the soft parts, quite down to the hours. Reflect these flags, and next divide all the soft parts quite to the hour circularly around the shall cap, a little above the appointmenth. Saw the shall sap cantinusty, and remove in. This will expose the outer surface of the dum mater. The shall cap may also be removed in fragments, by repeated bloves of a sharp-pointed hammer, without injury to the

done mater or leain, as wes first shown by Bichat.

and. Chautat. Duna Maren is a dense filterus sur enclosing the brain, which it further supports by processes or partitions. and serving as an internal periosteum to the cranium. The external surface course of course first into view. It exactly invests the interior of the reanism, to which it adheres more or less strongly, both by means of removes blood vessels, and likewise by numerous small fibrous prolongations. Upon this outer surface of the dam mater may be seen the branches of the middle meningral settery, and some of the houndless of its wine, adhering internally to the samplease. These are the resards which nourish the shall. The adhesion of the data mater to the shall differs in different regions; and to different subjects. It adheres very strougly to the upper margin of the pura petrico, around the great seepind furamen, and to the base of the skull generally; also in the line of the extress. In different subjects also, and in respect to age; in extreme old age, and in extreme youth, the union is most intimate. At the base of the skull, we shall afterwards find when the bear has been removed, that it sends some remarkable prelongations through it; one particularly into the orbit. Open the dam mater with the science, beginning just above the calcu of the divided home, and carry the anciston forwards and barkwards as fur as convenient. Make a similar incision through the dara mater on the opposite side, and lay up the flaps so formed. These incident will expend the miner surface of the flura mater, and the external surface of the brain; but austomically opeaking, these incistors open into the carrity of the amelnoid membrane, and rate the aust of the water in the disease called aydrocephales extensor. The inner surface of the dura mater, where it faces the brain, is emostle and polithed. This is owing to its being invested with a layer of the acrelinoidsurface ought to be from of all subsectors, excepting at those points where the cerebral seins proceed to open into the singses of the dura mater. It closely (outlies the viscoral or cerebral layer of

the araclould, there being an space between these are what a sufficient in contain the inhelecting sensity element to the seach. need with all surous membrases. From the leavesal surface of the dura mater proceed three processes or partitions which partially divide the brain bute subdivisions, and the internet of the ensetum into compartments. These prolongations are the fallerples, autorism corriells, and fals cordults. The liest two roudily be seen at this stage of the dissection, but not the falls carebelli. The processes can be very well examined spor a proparation, which will enable the attournt, in this lot first dissection of the brain, to avoid disturbing that myan, so us to endamer its after dissertion. They may horsever be examined in this way. Cus through the cerebral voice entering the superior higginshing strags on each side, and gently draw outwards the hemispheres of the brain, so as to wides the interhemispherical fasure ; by looking down less this fissure, the whole except of the felt combimay be seen. Again, by raising up the posterior lebes of the cerations on each role, the tentumina carefulli may be seen, had not very well examined. Indeed, to examine these processes of the dura mater, the brain would require to be dissected in aids, no sagnified alterether; and this would not be admishle, became the mechanical arrangement of all the processes can be well soon on a dried preparation. The fals exceller, however examined, is a median filmous lamina, having the abuse of a scytler, tester, stretched between the crists galli and the tenterium cerebelli-The point is forwards, dips into the foremen comm of Margaria, ravelopes the crists galli of the ethnical; its lose is behind, and fails perpendicularly upon the tentarism cerelcill. Where these two processes must is the straight come. In the upper or consermarrin will be found the outerior leagundinal sinus. should be laid open and examined at the present stage of the dissecules, because it will in part be afterwards destroyed. In- inferror edge fooking towards the estima collector, contains the lipferior langitudinal sirms. The course of these sinuses will be more fully explained aftermants. The uses of the fala perelsiare not well known. It is conceines slightly redshiren, and new for two metaneses are recorded of its total electors. The has nerves couldell' as an incomplete hardental septam, appearing the posterior lobes of the brain from the corcletions. It is a a state of maximal tension. The settenti organiferror coreappeals behind to the posterior half of the lateral grouves of the accepted home, for Indging the lateral almost which are formed or loaned within this purcion of the dura mater. Americally it adheres in the upper mergin of the pare petroen; and here the superior permeal singles paint. The canyout communication in tarcepts a arrail space, tilled by the your Ventili or taker onnelsers. The extremutes or points of their stargins or corcombinences rose such other like the letter X. The extramile of the external edge, so have to then to the posterior cliental process, thus forming lineards the commit of the petross pro-

tion of the temporal bons, a bridge under which posses the trifacial nerve-The point or extremity of the inner norgin or circumference of the tentamen pershell process to be attacked to the unterior climad process. These prolongations of the tentoriom will be better seen after the hearn has been numbeed; they complete the sides of the sells tweier or pitnitary fossa, and undose within their thickness the reversus since-The Foir Couldi cannot be seen at this stage of the dissociate. It is a small vertical median soythe shaped process of the dara mater, extending from the internal comparal profilement to the edge of the foramen magness occipita; it shirltly separates the hemispheres of the ometellum from each other. Its lass is fexed to the lower surface of the middle of the tentertum, the summit a beforested at the sides of the perpetal foramen. Its posterior edge corresponds to the internal occipital erret; its materms to the median hours of the emphallon. The uniquial stouses are formed in it. In westere the dura mater is remarkably strong. It has been usually divided into two layers, o tileous and serous. The scrous is asternal, the filmus external, The internal or serous is mendy the reflected lamins of the expleal machinaid; the fibrous or external may be further subdivioled into two layers, a periosteal or yascular layer, and a fileness propuriy so called. The separation between these layers is best seen where the sinusce are formed in the thickness of the dura The Gleads of Poerces, which are seen at this stage of the dissertion, are certain small hodies of a whitish or yellowish colour, sometimes isolated, sometimes collected together in the form of a lunch of grapes, which receive travels, but my destitute of nerves, of whose intimate testone and uses we are entirely ignorant, and which are not mer with in children or in all ochjests. The superar longitudinal sinus contains a remarkable quantity of them, particularly at its middle and posterior parts. They were farmerly designated by the name of Garch of Preckiose, although they are very different from glandniar organs-Tuese grapulations generally occupy in this sieus, the circumfesence of the scifices of the veins, where they form a more or less distinct possimence between the internal bridles. Very few of them are isolated, almost all being agglomerated into small masses, and intimately connected with each other. They are covered by the internal membrane of the stone. In the tournlar Herophili very tew of them are observed. But there are some at the mouths of the veins, in the computal portion of the lateral sinners. In the straight simules some are occasionally found at the ordines of the sense Galani. All the other stresses are destitute of them. In the external pia mater graniform boden resembling those of the sinuses are also met with. They are especially alcorred along and in the monde of the approx langitudiead stress, around the sereletal ratios. Here they are successful by the starting of membrane, and their eigr is so much larger the neuros they are to the sinus. Some of them are engaged in the

separations of the fibres of the dam mater which give passage to the years, and are in some measure continuous with the granulations of the sinus proof. At the two of the Italn and would the other simpes no abuilde disposition in discreed. The menral pia mater also presents some of these granulations. They are observed in the elected plexus, where they are a reddish gury colour, and rather soft. There are non some beneath the velon interposition, at the fore part of the pineal cland, where they are disposed in two rows or high unite so as to funn a tracella. Lastly, they are equally met with in the chomed pleans of the fourth vestricles We have already maken of the interies and voins of the data mour; its nerves have been much disputed, as it is quite insensible during hits, and in a healthy state. Comillater says that its nerves are derived from the fifth pair. The dura mater extends into the spiral mining the description of that nort of it will be found at 30%. The student may now proceed to remove the brain from its case. Our through the enterior part of the falx exceller, and door it operands; next divide the veins of Galen which enter the strught mor at the fore part of the tentorium cavelnili I then cut through the tentofrom on each side, and commence raising the brown from before backwards, cutting through in succession all the versus and Mond. vessels proceeding to or from in. Having reached the lack part, with a long and streep scalped cut the eninal macross as low down as possible. The entire mass may now be nemoved from the curity, and laid in pure mater for an bour, and immediately afterwards let it be immersed in spirits, or in a solution of rumssiye sublimate. Hy this mount it may be preserved out it the stadent his examined all the parti-felt on the lase of the entiremaand which he will now find fully exposed by the removal of that ergor. The while interest of the last of the craning will be seen covered with the dark mater, smooth and channe passes to the presence of the anchesid layer investing it. This surface the student should now examine with the greatest care. The following is the description given of ir by M. Clarquet :- At the base of the cramitta, the external curface of the dam mafor is very complex in its disposition, on second of the great number of holes and inequalities which are observed as that re-Je sinks into the foramen cocum, where it contracts pratty intimate afferings by several prolongations. It embraces the semmet of the crieta-galli of the ethicald house, where it desevels on each side into the othered generals there, at each hole of the cribitistics plate, it furnishes for each branch of the affectory nerves a small dibrous racul, which terrotrates on the onter layer of the parentery trembrane. More intensity, similar care in presents man the internal orbitar socials to accompany the nerves and smeals which they scutning and are continued into the perioderm of the othir. Lastly, alterether us the sides, the down mater afficers but little to the original arthur, even at the place of the sphenoidal outure. More posteriorly, it adheres in

a decided mainer to the grouve at the fore part of the uella turrice, and penetrates into the optic forming, forming an covelape. for the optic nerves. This cylindrical envelope separates when it arrives at the posterior insettion of the recti moseles of the uyo ; its noter lances, which is rether thin, expands into the pamosteom of the nebit; the inner, which is whiter, denser, thicker, and immediately applied on the name, accompanies it to the ball of the eye, and is continued into the selectic membrane. Behind the optic hale, the dom mater presents a circular aperture which embraces the internal estuded aftery as it issues from the rayamous simus; some fibres arising from the circumference of this operture, seem to three themselves into the units of the artery. At its underset part, there arenes the orifice of a small canal, formed inferiorly between the two lamina of the envelope of the optic nerve. It transmits the ophthalmic arrary into the orhit. The dara maner then lines the sella turcica, where it is covered by the pitning body, which separates a from the arathmod membrane at this place; it then passes over the sides of the hody of the spherood bane, where it divides into two lamine, to form the cavernous sinuses. The inner of these lamins is thin, and immediately covers the coversion grouve; the outer, which in free, farms the apposite wall of the sinus. On the free edge of the processes of Ingrassias, the data unter-forms a small field which enters into the fiscura Selen , then, descending from the ace vertically, it closes the spheroidal fascure, and sends through it a punkneption, thicker on the inner side, which proceeds into the colds, and in continuous with the periosteum of that eavity. This prolougation presents several apertures for the passage of ressels. and perves which enter the orbit. The membrane then extends such the middle lateral frame of the base of the common, to which it adheres but forhly; but, an appenaching the sides of the burly of the sphesoid bone, it furnishes first an envelope to the superior and interior maxillary nerves in the broay canals by which they pass out of the entremen; it also gives one to the middle morenged artery, and concer- to Jeen the cavernous situs and various careds. One of the latter is for the third pair; it commenors a little before the pertenor clinical process; it is filmens in its whole rigetunference, and invested by the arathrood cost at the runnicaccount of its course, but the latter efferwards leaves it to be reflected over the nerve, and there is no looper perreived a complete filtrons caral, but the luming of the dara mater alone, which forms the outer wall of the mayernous sines, is seen extermilly: internally, the serve is reparated from the sinus itself only by a thin and appropriate cellular membrane. Another canal belongs to the verve of the fourth pair; it is a little higher than this preceding, and much renewer, and, like it, is fibrous and lined by the amelooid mendeane in the first part of its course; afterwords, it is in like manner only formed by a single lamina of the dura mater applied externally upon the nerve, which is separated from the rest of the sinus by a thin and transparent membrane.

Lastly, a little farther back and opposite the upper edge of the petrous process, the dura moter forms a count for the ocrys of the lifth pair, runnigting of two lamine; the upper of these laming is attached to the posterior climat process, and is exentined uses the upper edge of the petrons process; the other is placed by tween the nerve and the cayermous since and become in thin as to be converted into a callelar lametic, which is prainted interonly of the ophthalmic housel. As it afronces, the meres of the third pair, fourth pair, and aphilialmic branch of the fifth, are exels engaged in a rest partism of entirely filmens canal, which is afforded them by the prelingation of the data mater passing from the aphoraidal disease into the artist. On the middle of the apper suches of the persons precess, the dam mater covers the superior frament of the viding nerve, and may easily be detarlied from it. It then adheres pretty strongly to the upper edge of the patroon process and to the quadritornal plate of the spheroid base, it descends from theme into the badler groove, and is infimabily attached to the compital lune over the whole distinsference of the formuen magnam. A little laterally, it presents for the we've of the sixth pair, a hole which is not spectated by a sand, and which consequently transmits at min the cavernous sinus. The gradusaid mentirate descends in it as far as that strus, which it class, and is then reflected upon the serve. Further on, and upon the posterior ourface of the persons process, the dura mater peachates into the meabus miditarius inferious, seems to enter the aquidest of Fallspins, but conset he followed into the forming which are traversed by the filaments of the portio moils of the seworth pair. Farther down, at the former laterum posterior, it emidones the glosso-planysgral, socure-gastric and spiral grassory person and is restrained into the presistence of the outer port of the lone of the skull. A thouse lamins suspends the internal jurnier vrine. It also work into the enterior conducted formers a librousearth, which is in like manner continuous with the percentrum. Next examine the simuse. These may very generally be made out by the dark blood they contain, and should all be laid open. The Sellowing description will point put their position, entrse, and connextons. The Sound are of variable dimensions, and disposed in a symmetrical and regular manner, large walls found externally by the fura mater, and lines internally by a smooth and polished membrane, of a errous expect, such as is mot with in the interior of all the come. Being commonly contained in all points of their extent, they can militer charge place, for even suntract upon themselves. Their cavity presents, at intervals, bridles passing irregularly from one well to the other, which are generally formed by thrones hundres of the dorn mater. It is into the simum that all the voice of this membrane, and all those of the bruis, smyly thursdays. Torrater Recaptific This is a smooth and polished cavity, of arregular form, placed at the serion of the there great finds of the dura mater, on the Sure port of the internal operation providerance. It is lined by the internal membrane

of the veins, and presents six apertures; a superior, of a triangular form, helonging to the supersor longitudinal sines; two inferior, of variable form and breadth, represponding to the occipital singles; as congrue, consiled, belonging to the straight sibus; hatly, two lateral, broader, but generally of different sizes, transversely eval, furnished with a thick rim in their conyour, and leading iron the langed always. The two last, and sometimes the two mierior, massim to the outside of the carriey the plood which is pound into them by the others. Superior Longitudinal Sinus (Sinus Fulciformis Superior). This is a large triangular carnil, convex above, presenting its acute angle below, unupying the whole upper edge of the falx corelyi, marnor before, brewler belind, commercing by a sort of cal-de-sac at the fore part of the crists pull of the ethmost Jone, and corresponding to the frontal ridge, the capital surure, and the vertical groove of the oreigital hour. In its interior, it is smooth and polished in its whole extent, and per units a considerable number of those bridles. (chimbs Willout), of which we made mention above, which are evested like it, by the internal mombrane of the veins, sinus empenunicates above with the frontal wins by a certain number of little veros which pass through the sagittal suture; it also rereives, in the same direction, were which rome from the diplice of the bones of the upper part of the shall; it also comminocates, by means of a small branch which passes through the parietal hole, with the view on the outside of the head; lastly, it receives some tranks from those of the dura mater, and all those which are expanded over the convex and plain surfaces of the two predeal fermspheres. They almost all open into its interior obisputly iscuards. In general, the mouths of the venes are covered to a great researce by membranous folds in the form of varyules, whose free and concave edge is turned forwards, All these folds are formed by the internal membrane of the valueapplied upon itself, and are in general much less withle in the anterne region of the sinus than in the posterior. It is also postable that, by its interior extremity, the superior longitudinal enter often communicates with a vein of the rose which process through the foramen currant. Inferior Longitational Sinus (Sinus Raleigarmia Inferior). Minch margower than the preceding, occupying the lower edge of the cerebral fals, from its unterner third to the tentorium revoledli, it seems to credit from the union of several small versus of the falx itself, and generally terminates by two beanches in the straight caus. Of these leanthes, one is directly continuous with it above the aperture of the verter Galent; the other ascends in the inhatance of the falk for some time, curves backwards and thewaventh, and penetrates obliquely into the sameht come newer's the middle of its length. The latter only is furnished with a valendar feld. Straight Shan (Since quarter, a. perpenticularis). Triangular in its winds extent, bessi behind, contracted before, pooring a little obliquely downwards and backwards, it prevails all along the base of the

falx, shove the tentorium expeloili, from the termination of the inferior lungitudinal sinus to the torrular Herophili. In its inberion, it presents the same appearance as the superior longitudia nal sinus; that is to say, upon its walls a great quantity of filmore hundles, closer to each other below than behind, form remarkable prominences beneath the delicate membrane which specy them. It receives the inferior longitudinal arms, as we large already said - the veins of the cerebral controlles or the your Galeni empty themselves into its unterior and infernit part, presenting a valvator fold. Towards the middle of its beight, and inferiorly, the streight since still receives the blood of the superior veits of the carabellum, through a rounded separation of the filters of the dura mater. Occupied Scauses | Sinus occipatella moderate dearer of similar). These tinues commission on the sides of the foramen magness, not far from the termination of the lateral simises, with which they sometimes occumunicate, and ascend, becoming broader, and drawing nearer each other, in the substance of the falls, concluding where they presty frequently unite altogether: they open, each by itself, into the lower part of the torcular Herophili. They scorice the seins of the fals cerebell, of the done mater which lines the inferior occupital fosse, and those of the posterior part of the cerebillon. Lateral minuses (alimes transmersi). They carry the blood from the torcular Herophila to the foramen lacerum posterios, into the sinus of the lugalar sein. Their course is marked by a grosse which exists on each ode of the interior of the common. A difference of capacity is almost always observed between them, the sinus of the right side bring generally larger. From the torcular Herophili to the upper edge of the petrogs process, they have a triangular form; in the rest of their course, their section is alliptical. Their interior, which is everywhere smooth and positived, presents none of the bridles of which we have made mention in speaking of the other simuses. They receive some reine from the cerebellum, the parterior extremity of the cerebral benisplaces, the tenturism cerebelli, and the entity of the tympinem. They also present in the second part of their source the prifices of the superior and inferior petroes singles, which carry the bland from all the other stones of the boat of the skull. By the mustold and posterior cordylaid foramiss, they communicate moreover with the occipital veins us the outside of the craning. Coronery sinus (almu circularia.) It surmends in a more or less regular names the sella turdes and pitastary body, passing behind the channel of the optic nerves and before or alree the quadrilateral lumina of the sphincid lume. It is very move in its whole course; if receives the small veins of these different parts and those of the neighbouring portion of the dura mater, and opens to the right and left into the common cinness. Can termina simular (steam meteration). These simular are much more consilirated than all the rest. They enumenes beneath the anterior clinald processes, behind the times think of the spheroidal

tissure, proceed from thence borizontally backwards upon the ables of the sells turners, whence they descend seco the place which separates the summit of the petrous process from the quadrilateral plate of the spheroid hore. There they terminate by empaying themselves into the seperior and inferior petrons shunes. Their breadth is considerable, and they are forged in the lateral grouves of the budy of the spheroid hore, between two lamins of the form unter- Of these two laminar, by an arrangement already partly described, the inner immediately lines the beay surface, and is pralenged into the spheroidal figure; while the other, which is much thicker, formy the outer wall of the sinus, which contains in its substance the nerves of the third and fourth pairs and the oydthalmic limited of the fifth, and closes the turn cutter thirds of the spheroidal fissure, becoming cunfounded above with the extremities of the tentorium cerchelliwhich those the since in that direction. Altogether internally, the latter lamins is swited with the first. The cavity of the caremove finites generally presents a great number of soft reddish filements, interlaced and so it were reticulated. The intimate nature of this kind of cellular structure is very difficult to be determined. It appears to be formed by nervous filements of the operior cervical and covernous garglions, the three of the dam easter, and the fields of the internal membrane. of the veins. There are moreover met with, in the interior of these same senses, the internal carried artery and the nerve of the exth pair, placed against their inner wall, and immersed a the bland, from which they are only separated by the delimite mornal membrane of the veins which curchages them. The morning amount orders a great number of meninged veins, the aphthalmic veins, whose rosts originate in the intemay of the type and orbit, several emissary using which traverse the spheroid lone, and the two coronary sinuses. Beneath the patintary hade the two caverrous sinuses have a very distinct communication, (now transportable, seller equium, Haller.) Superice pervens simines, (many perroni superiores.) They arem to arise from the termination of the proceeding sinuses, towards the stimult of the petrous process, whose upper ofce they follow, ladged in a printy distinct groove, and in a part of the great circonference of the testerious cereballi. They pass above the nerse of the fifth pair, where they leave for a moment the groups of the semporal home. They are less broad hat lorger than the interior; they open imp the lateral names, sowards the point where the latter experience a curvature. They are triangular in their interior, and present but a very few transverse bridles. Inferior petrous sinuses (ninus petrosi inferiores.) They arise from the currentus sinuses at the same point as the preceding, with which they communicate at their commencement, descend behind and to the putside between the inferior edge of the petrous and busiler processes, and terminate is the lateral structs opposite the sinus of the internal jugular vein. They are broader at

their extremities than at their middle part, and present the same structure as the superior petrons natures. Their juner wall, that which is immediately applied upon the bases, appears to be formed only of the internal membrane of the wine, so hamm of the dark mater being pennised upon it. The two petrons elnuses treater reins of no great importance, all of which come from the data mater. Some of them traverse the bonts and communicate with the outside of the skull. Transverse nion (some coupoids asterior.) Placed transversely at the opper part of the buillar process, it forms a communication between the union of the two permus simuses and cavernous sinus of the one side with that of the other. It varies in breulth, but is always of large size, and is lodged between two lamine of the dara mater, on a superficial depression of the bone. In its interest, it presends a very distinct caversons rooms. In receives several veinfrom the labyringle. It is by no means more to see two or three other transverse courses placed between the latter and the seaspetal bole. Should the student be disposed to trace the serves, of which he will have exceptilly examined the position in connexion with the dura mater, he may turn to the systematic description of the cerubral nerves, but we accumused him to procord with the dissection of the brain and sty remaining membranes.

364. Of the Cracerat. Assentagen. The layer of this memhome investing the inner currace of the dura mater has been aready described : the viscond layer invests the laten. On the convexity of the cerebran it invests the convolutions without penetrating into the anfractamities by which they are separated. and gives to each vein, going to the longitudinal sinus, a abouth which is reflected over the dute trater. Descending on such side in the great impitational frome, it lines the corpus valleston, passing over the arteries which cover it, and furnishes the veine of the inferior longimilical sizes with envelopes which are afterwards continued on the fally cerebri. Posterizely, the atachanid membrane is prolonged over the posterior lobes, envelopes some of the voice of the lateral sinuses, is reflected over the upper surface of the cerebellum, surrounds the yours of the straight times, and part of those of the lateral sinners, then owers the circumference and inferior surface of the corebellum, between the two homispheres. of which it is isolated by its two surfaces over a greater or less extent. Anteriorly, the unschool membrane descends over the antenor lober, and passes littoreliabily from the one to the otion inferiorly, usar the commissions of the optic nerves, without pisnetrating into the Essare which separates them. It equally 10vers the inferior surface of the olfariory nerves, for which it forms a small sheath near their extremity. It also furnishes one to mich of the optic nerves; but this should be conical accompanies them to a great fintance, and is only reflected upon their filmos enerlone in the artist. It describs farther around the infundiculum, and is expended over the pitmeary body which separates it from the days mater. It embraces the internal caretid arteries at their

exit from the caverness sinuses; it then passes under the cerebral produkerment being separated from the pin mater in all the space that exists between that probaberance and the commission of the optic nerves, which is also separated from it, but by a less marked interval, opposite the pratulerance and the general which limit the antenor prolongations laterally. It also gives sheatis to the third, fourth, fifth, sixtle, and secrepth pure of nerves. Leastly, it directs itself over the lateral parts of the cerebellium, the posterior prolongations, the passuregreative spiral accessory, hyporlossal, and first cercical nerves, the vertebral arteries, and the spiral marrow itself, with which it is only connected by a small number of cellular filaments, easily torn, and which in general scarcely exist, so that it may be very easily detached by insuffiction. On the sides of the spiral marrow, the araclassid membrane families correlapes to each nerve, and to each seria of the ligamentam dentation, which are refrested upon the dura mater when the serve penetrates it, and when the legamentum dentation is inserted into it. It also furnishes an envelope to the ressels which creep upon the automorand posterior surfaces. These are more carefully described at 55%. Lastly, an arriving at the lower extremity of the spinal margon, it terminates by a nort of narrow and very long carel, of a cylindrical form, which descends vertically in the middle of the burdles of the hundre nerves, to the extremay of the exeral canal, where it is reflected upon the dara mater. It is by means of this cared, and of all the envelopes of the nerves and speeds, that it may be conserved bow the amphrood membrane. oppers in its whole expect the loner surface of the dam mater, and gives it the smooth and pointed appearance which it presents. It is partly difficult to separate their two menhanes from each other by the scalpel, excepting in the feitns or in very young children. I have always malnusted that the enchoted membrane, sixtough if peneticips a short may towards the interior of the third sentriele, beneath the corpes callocam and funds, does not line the interms of my of the ventroics. The membrane is here reflected around the vains of Galera; it is the plasmater which proceeds inwants, into the interior of the synthetex of the hours. Beneath the membrane just described, and abosely investing the brain, is cituated the pix naver. In the interval between them is the subaparbroid space, filled with callular tissue, and here is compained the liquid of Countil. This figuid has been described more purticularly in section and.

505. The Pin Maran, (Memor federar), may be divided into two parts, an extremal and internal; ≈ covers the brain on all sales, ≈ prolonged into its internal cavities, and dips down into the animateosities and depressions which are observed at its corface. We also observe that, properly scaling its out a trie membrane and gives in the core amount order that same. It is a willial and, there are no properly with out of the core amount of the same, in which there is many and cross such other in a thomastic different directions a multimade of him of coveries, more or less delicate, and more or less delicate, and more or less delicate, and more or less delicate.

tortuous, and is only attached to the surface of the brain by the ramuscules of these vessels which penetrate into the substance of the latter organ, External Pie Moter. Ahme, the pin mater covers on each side the convex surface of the two lumispheres of the limin, sinks into their enfractausities, is reflected to the great lengitudinal fissure, postongs itself over the upper surface of the corpus callosum, and descends upon its anterior entremity; spposite the posterior extremity, it also hends downwards, but anten into the third ventriele. Inferiody, the pla sauter covers on earh side the outerson, middle, and pesturior lobes of the hum, strike tree the feeting Sylvit, is redicted over the commissure of the aptic nerves, after covering the membrane which classes the third scatnicle antenonly, passes over the layer of gray substance which forms its foor, envelopes the intentivulum, invests the inferror suction of the cerebral protoberance, is engaged in the greate which separates it from the spiral marries, on which it presently cruses in an insensible manner, to be carried over the lawer surface of the cercledhan, and from themes over the upper, as far as the posterior censhral feetire, he which it enters into the third ventricle. It winks between the ledes of the resubslimit and is engaged in all the nativacturation which separate its usecontric lambras. Hy its away surpice the pix mater is in contact with and others to the arachund membrane, upon all the cereheal premiseness, but is entirely related from it opposite the fitprestures into which it alone penetrates. They are then even frequently separated by a profty large vacuat interval, as may be easily sees to the fusura Selvii, in the spaces which exist between the laber of the cerclellam, between the bain and the catalral protoberance, Int. These spaces are filled by the liquir of Caturning. Its hour author corresponds everywhere to the termhad substance. The interest pin mater will be best understood, and can unit to seen when the vertricles have been laid open this rise the dissection of the healn, to which we next proceed. As at is to be presumed that the student has attended one or two demonstrations of the lawin previous to his attempting its dissection for himself, we may commente the anatomy of this vegas by examining its blood-vessels; its arteries and veins. Place the brain upon its vertex, and display the arteries which are cheely found on its base; this requires a little careful dissection, so as not to remove the rants of the nerves. The brain is supplied by first meat atteries, viz. the internal cannot and vertebral. The former are brouches of the common emutids, the latter of the subclaying. To more those externes in the first part of their course. a recent disacetion or ducid proparation must be referred to.

506. The ISTREMAL CARRYDE ARTEST, (it being enforced to describe one of them), separates from the external behind the discretion stands inter the space between the range of the informer craftle and the planyas, and assemble twenty, be animally as it approaches the shall, map which is saving by the internal jugular count count. It is assembled externally by the internal jugular

vein, internally by the passure-partne nerve, the superior carvical resiglion and the firig by which it commorficates with the middle certical gaughts. It forms at first a curse whose convexity rests upon the corebral column; near the skull it presents mother having its convexity directed dominants. Its ultimate course will be afterwards traced. In passing through the carotid canal, it accommutates frield to the different directions which it follows, to that from being at first vertical, it afterwards covers itself a little obliquely forwards and upwards. This portion of the internal carolid artery is surrounded by the percenting filements of the orperise corvical gaugiton, and the lamina of the days mater which lines the carol. Betom emerging, it gives off a small bronch, which penetrates by a particular aperture into the savity of the exemperation, to be distributed to its mucous membrane and to the promontory, on which it association with a riving of the milfills meanigeal artery. Frequently also it furnishes another which enters from behind forwards into the Valua canal, and then mustomass with the artery of the name name. On amerging from the could the internal curotid artery directs itself upwants and a little forwards, enters into the payernous same of the dors. uniter, and follows anteriorly its lower wall, on the sides of the body of the spheroid home, to above the anterior clinoid process. being enveloped by the inner membrane of the sinus, and accompuried by the righ nerve and governous ganglion. In this course, the artery forms two curves which pretty exactly resemble those of a Roman S. The convenity of the first is turned backwards and approveds, and that of the second forwards and formulates While contained in the cavernous stres, the internal caretif artery sends two or three twigs to the dura money, the principle ludy, the membrane of the spheroidal sinuses, and the toucks or the third, fourth, faith, and sixth were of nerves. Arrived under the interior climaid process, it curves vertically apwards, then dierers about a little luckstands, is embraced by the dom mater and arachreid membrane, and enters into the cranities a little externully and preservedly of the optic perge. It is afterwards coreloped with a sheath which is famished to it by the amelanted mendrane, ascends chiliquely fackwards and outwards, and seporates into several humches expende the fiscora Sylvii, where a terminates. But before this, whilst according along the auterior climid process, the internal careful artery furnishes a very to contradic branch—the opinibalistic artery. After giving use to the ophibalisis array, the internal corotid procures in the interior of the gramum several branches distinguished into posterior and maration. The first are the communication and communication to the enliers, the autories and made control arteries.

567. The Communication during or William, It directly said addiquely backwards and a little immands, passes over the safe of the intendibalium and manufallary eminences, above the analysis northware, and are mally of the thickened edge of the middle lobe of the brain, and goes to open into the posterior expelical

satery, which is farmished by the basilar. Its sint, which is in general rather molecute, frequently varies bowever, and is not always the same on both sides. In its course, it sends very slander maniferations to the apric challent and serves, the manualllary eminences, the rates shorpes, the introductions, the chomoid plems, and the course of the train. Propurely the two which belongs to the opine theorems is much larger than the others.

508. The Anguar of this Chonom Plance. Always less than the proceeding it arises above it, and preceeds obliquely back, wasts and outwards, towards the crus of the teain, close to which it extens into the corresponding lateral countries by its infection fascing to lose steel by auditiviting in the shound plance. But before this, it gives a great number of twips to the thularms of the

optic nerva-

56%. The ANTERIOR CERRIAR ARTERY directs itself alsliquity forwards and inwards, between the optic mayo and the posterior region of the agrarier late of the brain, as far as the great liseme which separates the Ismospheres of that organ from each other. There, after femishing small twigs to the pla mater, and offerency nerves, it somes very near the norresponding artery of the other side, and motes with it by a very short, but partty large transverse branch, which is named the outerior creasunicating actory. Sumstings this lampely is substituted by three at four parallel twice; but in all cuses, it sends one or more small twins to be distributed to the forms, the anterior commissions, and the septem of the ventucles. After thus communicating with each other, the two autories constral arteries charge their timetion, proceed formula and dive, parallel to each other, between the two anterior laber of the brain, turning over the corresponding extremity of the corpus callowing. They then percent from before backward over its upper surface, at the posterior part of which they terminate by subdividing, so us to embrace that ledg enturely in an arch which exactly represents its form. It is to this and that the name of actory of the corpus redistant is comments given. In this second part of its course, the anterior prereland artery sends from its concave side a creat number of small twice to the corpus calboren, while, by that which a convex, in farmishes convenient larger temps to the plain surface of the cereheal hemispheres. These twips are holged and subdivide in the anthogosaries which this sucher presents, and are prolonged as for as the convex part of the same homisphones, where they commantests with those of the mildle and posterior readest arteries.

ATO. The Minute Consumer America is much larger than the sententiar, it seems to be truly the remnesting branch of the internal constill. Directed enternals and hathwards, it goes at first a great number of twice is the house part of the besits, in the payment which course is remne, and in the charact pleasant it the content into the manner Spirit, and decides into two larger learning, the man to the americal tobe, the other is the middle labor of the bross. These beauties had believed, refinance

deeply the fissare, and end towards the posterior part of the brain, where they subdivide into a great number of twips. In their course, they also familie same, and all rates regarder into the circleal anfinctionalities, forming many worders, and smillying in the pin mann, to such a degree as to convert that morehymes into an extremely fine and close rescalar net-work, from which issue the arteries which are distributed to the substance of the brain. It is only in some particular places, which we have already made known, that this argain reserves travities of any sine, as in the optic thaland, near the mediallary roots of the ulfactory nerves. So,

571. THE VERTEINAL ARTSHUR ure the largest branches of the subclavian. Of these also it will be sufficient to describe the course. of our. On both sides, immediately after its commencement, the verticinal artery proceeds directly upwards, behind the inferior threrood artery, upon the vertebral column, hereas on the langua rolli and sedimus antique muscles. At the cod of a more or less short course, it enters the hole with which the have of the transverse. percess of the right pervicul spricing is perforated, and sometimes that of the fifth, without having given time to my branch; in other payer cases, it enters these hales only at the fourth or third vertebra. It then ascends in the coral which results from the aggregate of all those holes, with which the transperse praessum of the cervical verteline are perforated, and which is compleased by the intertransversales mancies. In this part of its extent, it passes before the trunks of the cervical nerves. It thus arrives at the axis, having only described very slight flexuesities; but it then leaves the carely directs aveil fuckwards under the trachelo-mustoideus, and forms, between the two liest vertebra, a. Vertical curve, the convenity of which is directed inclewards, upwards, and inwards. It then proceeds upwards and outwards asfar as the transverse protein of the atlas, of which it perforates. the base directly upwards, under the utiliques rapits infector mode; after which it passes backwards and invards, and dewriter, between that vertebra and the excipital bane, in the triangular space of the rests posted and oblique copalis muscles, a second transverse curve, whose convenity, also directed backwards, is covered by the complexes and rectus rapitle porticusmajor muscles, while its contravity embraces the side of the posterior occipito-atlantal Learners. Lastly, the two verteheal arteries pass through the operatures of the two extremities of the same ligament, and through the days mater, and enter the crurium by the occipind foremen, on the sides of the spiral marnow. They then converge and assend in a permon momen inwards and forwards, between the curpon, pyramidalla and obvaria and the busilar groove, on which they units angularly, to give rise to the builds energ. In the centel of the transcent percesses, the verteleal artery sends off several brametes in all directions, of which the external, antique, and posterior emerge between these processes, go to the intertrapy resules, scalent, recins capitis anticas major, trachelo-mustoideus, and splanius muscles.

and communicate with the neighbouring arteries, while the internal penetrate into the vernitral canal, by the inter-vertebral foramins, to expand upon the spinal marrow and dura mater, smacomosing with those of the opposite side. Is its certiful curse, the vertaled estery sends internally and inferiorly of the abliques capitie inferior a small broach, which bifurcates as it de-One of its raigs a distributed to the semi-spinalis calli and multifiens spine and the other, (Art. mesiagor posterior,) ascends under the protector early of the atles, to be distributed to the due water. Moreover, there also separate from it some twips for the chilipurs capitis inferior and trachelo-matrides-In its transverse curve it wents a considerable number of twigs in the resti postici and obliqui capitis muscles. One of them, larger than the others, is transverse; directs itself inwards, and presently divides into two transhes, one of which, anystomosing with that of the approximately constitutes a kind of arch between the complexi and recti capitis postici majores muscles, while the ration, descending obliquely, is distributed to the latter and to the rectas postieus minor. Posterior spiral artery, (art. spirado poekrun.) It arises from the vartebral entery, near the curpons pyramedalia, and sometimes from the interior vereliellar artery. directs itself downwards and a little obliquely inwards, passes behard the spiral marrow, and continues to descend parallel to that of the apposite side, as far as the second lumber verteling. It is extremely slender. All in tisigs are transverse, and amenimum with those of the opposite side, or lose themselves upon the pupper membrane of the spinal marrow, sending only some absointely capillary ramifications to the pulpy substance of the latter. Anterior spinel orders (art. spinalis auterior.) It is a little larger then the preceding, and arises internally, near the termination of the vertebral artery. It even sometimes comes from the inferior cerebellar or busilar artery. It descends in a tortume transper upon the anterior surface of the upper extremity of the spinal marium, gives some camifications to it, and unites engaledy with that of the opposite wife opposite the spriptal faramen. pendits from this amon a very features common trunk, which descends as for as the lower extremity of the spinal marrow, giving off, to the right and left, twigs smilet to those of the posterior apinal arteries, and which is afterwards prolonged, without dividinc. in the midst of the persons filaments forming the made squine, as far as the articulation of the sacrons wife the sperya, where it terminates by acceptantising with the twigs of the leteral Japanes medallar artery (art. inferior cerclella) menal arteries. It seizes externally from the end of the vertebral or even from the nasilar trunk. Its size is very variable, although almost always twetty considerable. It directs itself transversely culturards, orosing the curpus pyramidale, passes beforeen the seagins of the corresponding pressure-grattic and spinal arrowary nerves, and advances in a serpentine monner upon the inferior surface of the corebellum. Its first theirs, which are very small, are distributed

to the superior extremely of like spinol marrow, the drigins of the presume-partite and hypo-glassial curves, and the walls of the fracth vantacle. But the last, which are much larger, every miler the hemisphere of the carebellism, as far as its coronaference, where they communicate with these of the superior corpbellar artery. There are only some which penatrate into the autracrossities; the rest subdivide at the surface, and dram a very

line nea-work in the plu maters

372 The HASHAR ARTSRY (orderic benieved, results from the anion of the two vertibral arteries. Langer than either of them individually, it has yet a smaller calibre than that of the two augither. It commences postenony towards the errowe which separates the cerebral probabenates from the medicin oblongara, ascends, describing some demusities, in the grouve which turn along the middle part of the proinberance, and such contentity in the interval which supurates the crim of the brain-It therefore corresponds above to a groove of the possiberance, and restributor upon the handa groups. In its short course, the busiler arrary gives off on each side a great number of small investigation and dictions twigs, which are distributed to the postubecomes, the correlation, the corpora olivaria and pyramidalia, and the accustic, facial and trifacial nervey. But there also separate from it two somewhat more remarkable brasches, which are the superior corobellar. Superior corebellar artery (art. terhalf separate.) Arising from the busher arrery, near its termination, it directs itself outwards and backwards under the protulesnance and crus of the brain, around which it turns to second upon the upper surface of the cereb form, opposite the inherestic quadrigenima, and after sensing a great number of twigs over the promberance, the crass serelei and cerebelli, the tubercula quadrigomins, and into the pinesi glind, the choroid plexes and the valrade of Vieumans, it divides into a great number of branches, some of which around in a very flexators introsecupous the posterior labe of the cerebrum, whilst others descend upon the upper surface of the cerebellion, where they are distributed like those of the inferior cerebellar actory. The mailar arrery terminates by separating into two branches, which are the pasterior cerebral arteries.

573. The Postermon Caugusar, Agreer (Art. carely) profunds, is much larger than the superior carelellar, from shirth it is separated at its commencement by the nerve of third pair. It proceeds at first forwards and outwards, then presently directs its sail backwards, tunning over the corresponding cross of the brain, whether it gains the lower part of the pasteries lobe of that organ. Immediately after its commencement, it familials several small twings to the manufallary subscribes, and to the crims of the brain; it sends a large one into the third venturals for the thalance of the optic nerve, the labor conserum, and the asterior pillars of the farms. Precisely in the place where it is in cannot with the nerve of the third pair, it receives the communicating army of Willis, which comes from the internal research. Afterwards there still proceed from it a considerable number of twigs for the cerelend protuberance, the error of the Irons, the churcid please, the thalamus of the agric nerve, the autisu Ansmaris, the evapor straatom, the pincal glant and the mherenia quadratic The branches which this somey scode over the lange drag into the anfractionallies of its peaceting labor, and subfireids in the par make like those of the other combral arteries, with which their ramineathers areastimmese. The posterior emphysis arteries, the communicating arteries of Willis, the asteries conduct, and the autorist communicating artery, form a sort of purgoe, in the area of which are situated the mammalines consessed, the taber consum, the pointing body, and the infinclibulum. It is also to be abserved that the principal trunks of the arrenes of the brain occurs the least of that argan, and are played between it and the boar surfaces, so that the motions of the arterial circulation are timmunicated to the leafn, as was first distinctly puryof by Dayemer. This impulse is transmitted to it in a uniform manner, on account of the extensive meatomoses of those different tracks. purpolipal branches of these same tranks are ledged in the figures and infractionities. The twice sublivide to infinity in the pix mater, and it is in reality only the expillary extremities of the versels that posetrate into the pulp of the organ.

It would forther appear from some experiments made recently by Sir A. Corper, that he some mirrals much distress is necessarial by compressing the vertebral similes, although the emptids be left pervious to the passage of the blood, and our nerse; it would also appear, that when listly vertebral and both caracids have been tird or as to cur off altogether the supply of bland to the broat and spiral both, the animal diss immediately. This result was to be auticipated by previous physiological facts proving the informers of the bold and resident hodies aver respiration. When the aximal dies immediately in consequence of the ligature of both verithral atteries, it is simply due to the fact that the arterial circle of Wellis is not always manufacts at an arrevial anastomosts; even in men I have often found the communicating artsrice of Willia more threads not admitting of any blood or injention. When this happens, the animal must the when either the vertebral or careties have been tied. There is making premiur. or singular, or even measurered in this; it simply confirms the long established fact, that on the integrity of the bulb depends the function of responsion, and that if the supply of blood to the high he suddenly out off by the ligature of the prost arteries, its functions will dense, and with it the phenomena of life in the higher arimals, or whom vitality is so through dependent on the functions of respiration.

574. Once or rice Cannat Newers. The student may now remove the vessels and combiness at the base of the brain, and common the coming out of the roots of the cassial nerves or cheir agreement orbits. These commined from before backmards, are left. The elfactory, whose apparent origin will be found about the

commencement of the usame of Spices; 2º. Of the optic, the student may observe a spasiferable part of the fractics opinion. the citizens or commission, and the divided extremities of the nerves thermelyes; the 3d pair seem to some from the inner side and facts part of the trues coredn; the bib may be trued upwards towards the deep parts of the britis; it romes from the valvale of Viewerns, a part which cannot be seen at present; the 5th comes out from the sides of the peas. Virtuin; the fith, from the feer part of the medalla ablangate; the 7th, (portio mollis and portio dara,) seems to utage from the top of the cornors restiformly and they of the 4th ventriele; the filaments or roots of the 5th, (glosse phacyages), nerves vague and spiral arcustory), may be seen coming from the audulity chloresta between the respect restiformia and olivarra, and the division colled sporal accessory from the sides of the spinal marrow; and the 9th or hypoglescal, from between the pyramidalla and elevaria. The filaments by which these nerves communicate with the beain, will he examined afterwards.

575. OF THE BRAID VIEWED PROOF ASSTER THE HERIN MAY now by examined either from above downwards or from below upwards; the first method will best unit the stratent during his first examinations of this organ. Place the brain upon its beer as ettwested in the body, and remove as much as possible the negotianes: from its convexity. This dispurys the Consolution. In the mixed meas of Europe, these convolutions are not symmetrical, but they probably are so in the Bosyman care (sellow-skinned African race) and even in the name. It is possible that the same remark may apply to many pers reces of man whether white or black, but it pertainly does not apply to the now existing European tamily of man which is an extraordinary mired one. A transperse sartion of the upper surface of the limit made in its to take off about so inch of its self-stance, displays the two forms of matter composing it, vin the cortical, crey or einerations, and the white or medullary. The grey is probably the seat of the invelligance, the white or medallicy of motion; we have publicly maintained these opinious for at least twelve your. The grey matter is very vascular and not fibrate; the metallary or white substance is distinctly fibrons. A section a little allows the level of the coryes callesum, displays the great homophesical mobility center : a section on a level with the corpus callmann shapes the analysis orale of Vienseus. The copus call one is a ponerful massagne commissure connecting the hemispheres of the conclusion to each other. In length it is about there and a half inches in the adult beain, which it is presumed the student first examines; this body presents a superior surface, an inferme, and two extremnes. Upon the superior surface are observed the purify, and the unterior of the corpus callosum which in the progress of the dissection may have been removed. The inferior surface of the extrans callosum contributes to form the eviling of the ventricles at the sales, but in the median line it is situated immediately

These will be us. above the septem leaving and the ferries. amined afterwards. Next lay open the lateral ventrieles by castionaly empine through the sides of the rurpus callosins, and leaving powerrated into them on such side, by them open with the tarrelle of a scalpel throughout their whole length. sentricle thre displayed are two in number, a right and a left; they communicate with each other below the locale and though the third systereds, but there is one point where the lateral venthithe currentments with such other besents the ferris more direcity than at my other part; this is towards the fore part of the ventricles near the point where the corpora strials join the thalani recreasing opticorum; here the communication is very direct, and to the firms is norrow, it led the second Dr. Munry into the regimen, most certainly arrangements, that the lateral centricles of the brain communicate streetly with such other, whereas they only communicate through the third. Next attend to the objects agen in each of the lateral syntricles; It. The asterior hom (esquaamerica); 2". The onpus strictum; 5". The tank semicircubeis and lamins comes ; 4". The thalances news optici ; 5". The posterior hars, digital ac aneymid ravity; (V. The hipporampus mmort. 7s. The chircled pleans. Next make an incision through the lateral mass of the hemisphese following the foreign down towards the base of the brain; this will display 8%. The inferior horn of the ventricle : 95. The corner assuments : and 10%. The finding corpus limbriatum pr tania hippocampi. He may now return to examine more at lessure some of the parts thus maned. Between the corpora stricts is the septum bundum, forming here a partition between the vestricles and upon the base of the westricle may be sees the commencement of the versu of Galen. The hippocampur miror raries much to appearance and wine t it is sometimes double and penasionally absent. The chound plenuses which are seen susom as the lateral ventricles have been sufficiently hid open, cannot he well understood until the engus callovain and furnix have been cut through and raised up; we shall therefore return to their andtony afterwords. These bedies are rascular, and have a granular appearance, but their uses are anknown. They are intimately conmened with such other by the tela charmism or veium inter posican rusning below the fornix, and as they are metinesus with the parameter covering the external surface of the brain, they have been called the internal pin mater. Next return to the medim parts which is between and ever the ventricles; ear through the empire releasure contionaly, and mise its autorior part from the centum luridem; this usually fours off the upper part of the septum locidow, and express its ventriels, also maned the Office sentrace. The opport margin of the septem lacislism commanipure with the curyon recomm, the posterior with the forms and the antistive pellars. It is formed of two limiting and a venoricle between them; the nulls of this rentricle my amounth and glussy, making the the other ventricles, but it does not commu-nions with these. The removal of the responseshearen express

the Florur. This body is continuous above with the corpus callosms; it is of a triangular slaspe, and has four pillars, two autorior and two pasterior. Below it is placed the velum interposition or tela sharebles. Cut through the foreit about the middle, and reflect the divided portions interiorly and posteriorly. This shows the interjet surface of the forms, called few, poulte. rium; also the anterior and posterior pillars. The anterior pillars of the formix may be traced downwards to the corpora conficould in the base of the brain; the anterior commission of the brain runs in front of these pillurs. The pasteries pillurs of the famix proceed harkwards and downwards, to terminate by chiefly forming the menullary layer investing the corns Ammonis and the corpus findetistion. Investigately below the foreix will he found the tela choroides, a vacular membrane uniting the channel piexuses to each other. If a probable pucked lockwards below the formit, it will be found to pure to the exterior surface of the brain by an extended Source (the great careleal fasture); it is by this fissure that the pin mater enters so as to form the veinn and the chaosid pleasures. This fissure extends quite shows to the base of the firms between the posterior pilling of the forsix and the thabani neworam entleasum. Next out through the back part of the femix and surpus callesum menally, and separating the parts from each other, name the values interposition and veins of Galey, through the fissure to the exterior of the brain. The sules se tele is of a triangular shape, it has in the third contricle; its edges are continuous with the choosel. plexuses, its asterior extremity is hilld, and reminister below the introwest part of the fomey. Posteriody it is continuous with the external pia mater and incluses partially within it the coveries. se pincal pland. Raise up the volum after disserting the pincal gland, and removing a good part of the membrane, expose the greater part of the third ventricle more fully. This ventricle is placed upon the middle plane of the least; it is a very narrow abling cavity, or nother flasure. In it we observe, 1st, the comwissum wollis, connecting the two sides of the thidaud nervorant onticurum together. This commission varies very much in shape, strough, &co., but I have only observed it to be note about in many handred bricks examined with more or less care; the openargs in front and behind the commission modis, used to be called this arms and sulva. Anteriorly this ventricle leads towards the infundibulous, and tuber eineream which have contributes to form the floor of the ventricle; at the sides are the flulami nervyrum optionum; behind, the pixed gland, its pedencies, the empore quadriganino, posterior commissure of the besin, and beausals it the aquaduct of Sylvins, this passage leads from the third to the fourth ventricle. It is, as it were, bellowed out of the substance of the athmus, above which it is placed. We have already mentioned the pineal gland, its situation and pedicles ; in it are usually found a few gritty particles or concretions (acervalus.) The part which next requires examination, is the VALVELE of

VIEWERENS and FRURYII VENTRICLE. To examine these with advantage, push tack cautiously the median part of the cracbellanto far to possible, this will display the valrale of Viestsarns which essists in forming the online of the fourth ventrule; can through the median part of the carabellism, and by this will be expuned the posterior opening of the oppositor of Sylvins, and the cavity of the faurth ventricle. Connected with it may be seen the calances scriptorius; the posterior median fissure of the medulia obloogada, the origins of the portio mollis, the crura rerebelli u medulla (extpota restifermia); the crora rerebelli e inferrulia. The valvule of Vicusians concerted these crura in each other, and extended from the posterior tubereles to the median part of the gerebellium. From its appearance at seems to belong to the peculiar formation of the cerebellam, that is, its attracture is more analogous to it than to the cerebrum. Finally, in the fourth youtricle are small charoid planuses, and the sentricle is sing up at the back by the arachnoid membrane, so that there is no communication between its ravity and the araclmusi cavity of the spiral estours.

576. The BRAIN TIEFTED PROSE SELLOW. The breen may now be turned upto its upper surface, and the purp som at its how examined carefully. The Revinline Bolly usually called in this country, the medido obloques, terminates superiorly the spiral marrier, with which it is strictly continuous. It lies in the busilar force of the occipital benegond unites the medulla spiralis to the corelation and conshellom. Its limits are well defined anteriorly, but puricricely they are perfectly artificial; it is usual to facits posterior limits where the decuseation of its fibres takes place; anteriorly the transverse three of the influent sufficiently paint it out. thereast that the prairies of the built value a little during flexion and extension of the head. On the unterior variance of the bulb, are, P., the median besure and decemption of the filters and to the right and left of this demonstron and financiate the entireir paramete. Outside those syramids are the corpora almora. These are shorter than the pyramids; thus they do not much the isthmes enterior-By, while pasternity a series of filtres, (arth-firmal friess) limit Those of the arel-formed films which proceed alone ELANDI. with the corpora restifermin to the combrillum have from opticidened by Mr. Sally as proving the passage of motor fibres from the anterior columns of the spinal cond to the prochellant. filements of the hypo-gloreal narrow could out between the olivaris and pyramidules perfects Essure severates them from the corpora-When not into the corpora elivaria flisplay an appearance called response thombacleton. The pasterior enforce of the balls has been already examined when speaking of the furth It is formed by the corpus natiformic, which are also called entries perhander of the cerebolium. But many fivide the corpres restifactain into two parts on each side: to the cords which run up on each side of the peaberier median fissure, they give the same of posterior pyramid, or posterior median columns; and to the large lateral portions proceeding electly to the cerebellum the name of corpora positioning is arrenved. The lateral surfaces of the both are chiefly remarkable for the orea-formed there, so well desembed by Samueini and Redundo; I have seen them in one or two brains remelably large and distinct, but they are also extremely inegular in number, &r. They seem as it were to seize from more to the anterior median fisture, and asyending divide into two buildies, one of which proceeds to join the interior pyramids; the other joins the corpora restiformia, and probably in this way reach the combellium. Whatever be the physiological views in propert to the structure of the hall, the following austonical facts merit attention, at least until they be refund by more careful examination. The untrine assemble are not seemed out of the outerer columns of the medalla spinalis; the posterior fesciculi at the medulla separate into two divisions on a level oright he bulls. The medialary fibres of the apinal marrow having reached the halfs dayshe into two buildes. The the asterior; this passeng into, or becomes the unterior pyramid, and proceeds ultimately to the continue; the other postenor, restriant body, presents almost entirely to the perchallem a the fitter composing the autocide or occeptal fuscional come chiefly from the deepest part of the messale; those congoing the cerebellar fuscicul, spins closely from the anterior from of the medalla. A facricular amenianus has been larry described as commenting in the balls; it is so estuated as to form the anterior wall of the heath wentziele close to the melius lissuer, and it beminates in the Mediana and systilizer budy. The existence of ofrery forceds has always appeared to us extremely doubtful. Next examine the Poss, Islama, or counter protoberance. Its limits are well defined; in volume its development follows that of the letteral lobes of the ognibellum. As the pone is usually, or at least at first examined from below appearin, or commencing by its interns surface, we shall follow this method here. The infestor unities of the pure is compared of first transverse medialtary fitting which go sloudy to form the crura carriedle, whilst from the anterior part of the pour proceed the erana cerebri. Tease erars peretri fallow to their development the ratio of the excelled hemispheres. Their recess is onlines and diverging, leaving a triangular space between them, filled by the substantia pertonita, the mamillary enionion, and the taker emergumhave already examined the superair pelundes of the cerebellum, the valvade of Vicessens, the aganduct of Sylver, and talanceda quadegemina; but as these parts in some meseure belong to the system of the price, the student should armin, at this stage of the dissection, examine their relations with it, and with each other. The labords are estuded on the superior surface of the crum cerebri | from the anterior proceed films to the tractes options: the ovpore geniculata (externum at interaum), may now by base seen upon the posterior and infertor surface of the thalasses neryl duite

577. The Posts or Premierous when dissected, exhibits the

soliawing ports:—1°. The superficial layer of transverse falces proceeding across to the hemispheres of the confedime. 2°. Above these, but not in any very regular ceder, a series of assuppositive filtres, which are the continuation of the actorise payamide of the bulb, and which, traversing the possition behind forwards, proceed must be cross serebei. In the centre also of the influence may be traced the fasciculus of the arigin of the fifth pair actions. It is usual to divide the layers comparing the proximations stages or planes, which may readily be made out either by

settrical ac transverse sentions of the pora and hults.

578. The Comparation into which the dissector will by this time have traced the passage of its crara on each side, may now be considered more minutely. To respect to softeme, it is larger in man then in any other animal; its ratio to the revelents is as one to neven. On its superior surface is the serves superior, which is merely the superior surface of the median labe of the cerebellum There is also to be remarked the hemispherical fissure, the hemispheres themselves, and inferiorly the affirm or was. Externoon the condellam has a very different appearance from the condenna; in presents finances and laminas, and about the middle of each beninobere is the cules dormatalis, which penetrates very deeply into the interior of the organ. The lamina companing the cerebellum are situated upon each other like the leaves of a book; but within these are lamellar which go from one lamina to another. Besides there parts, some anatomists, as Markel, speak of lotes or lotaics, to be toon upon the surface of the reveletions, and of a basic of the paramo-patric nerve, (focular), sinused lished the paramo-gastric nerve, but under the facial and sudlinry pervey. The Furth Fasteriole, sometimes called the ventricle of the comballum, has been already examined. This ventracle is shut in hehird by the inscirnic, we as to cut off all communication between the rapity of the wotricle and the general warshood cavity (agreus early) of the bend and spiral column. Mr Magazinha thinks, however, that the End contained in the fourth ventricle may find its way into the opametinoid space of the spend cord, by two spenings which he antes to exist between the inferior conclular arienes, and upon or near to the median line. There is nothing improbable in the existence of such openings, but they have mitternly appeared to be artificial, that is, made by the dissector, It is said, however, that if a field be forcibly injected into the Interal and third wentricles of the brain, it will make its way by the squednet of Sylvan and fourth vertricle min the subsamplinual collular tissue and space of the spinal practicoid. The pin mater forms in the fourth weathir's two small chomid pleasures. The precise structure of the committee between the inferior verms of the cerebellies, and the restificin ludies, lige me been as yet cloudy made out by anacomists; seems authors speak of a fibrous bandlis shorting in the fourth voltricle empletely lishing; I have only as yet observed the ararhmete and six moster, although at the sides there are oppermittee indicative of such a lamina, but its limits and countryinto have agger been elegily made out. The corolellum when cut into, shows the corried and modulary substance psculiarly savanged, on as to form the order wife, the interior of such he-

misphere liberate contains a large corpus should have.

579. In empelment, the dissector may re-exemuse with more care the division of the exceptialic mass strictly called coolerun, although most of its parts have been already seen. The great size of this portion of the encephalm is undoubtedly a remarkshile feature in the human organization, and although it he not true that the intellect in its most extended sense is in the direct ratio of the cerebral mass, yet below a certain standard as to bulk there is no intellect. The pendral hemispheres, then, are remarkably large in man, and to all the meter of men equally so ; thus, if the different races differ in the degree of intelligence passessed by each, it is not owing to any inferiority as to volume of town, but must be dependent on some other specific qualities of The male bearn is heavier than the female; it is also larger; it waries from a little less than two pounds to nearly four pounds t the average is under there pounds. We have already examined the upper surface of the cerebrum, a few points upon its inferior surface still merit attention. Each bemisphere of the personner inferiorly is divided into three lobes, an anterior. middle, and posterior; there is often a great want of symmetry between the hemispheres, and an obliquity in the great superior median fissure, but this does not necessarily imply an obliquely in The base of the brain must be examined very cararully after being cleaned of its vensels and membranes. We have already spoken of most of the parts seen here; they are placed is the following order; the enumeration applies only to the loss: 10. Lower surface of the anterior lubes and great median fromes. 2º. Finances of Sylvius. 3º. Behind these the inferior angles of the great cerebral fiscare. In the middle, the commission of the optic nerves, the infundibulum and taker emercum, the corpone conflicantia, the inter podumedar space or substantia perforata, the crure receby, another protoherance, &c. A horizontal section of the commission of the optic nerves about a distinct decursation of its fibers. The tuber einercom, infuntibulism and pitchary holy seem to belong to the name system of parts; their sacs are entirely unknown. A tolerably accurate idea of the structure of the brain may be obtained by following the saterior. pyramids from the bulb through the problemanne, grans couldn't finland servorum opticorum, exepora seriana, and finally expanding into the receival hemispheres and their convolutions. fasciculus innominatus of the balls may be traced above the execheal protuberance into the optic thalami. From all the external parts of the thalant, fibres proceed in a radiating manner into the convolutions (norms relians of Reil); most of the white films of the corpora striata proceed from the thalami. A differuses of opinion exists as to the mode of connexion between the cadiating fibres from the thilami and corpora striata and those ferming the curpus callesum, some supposing that they are contismess: they have generally appeared to me to be interrupted by grey matter. The brain of the young child is extremely soft, and previous to birth, the distinction of its texture acts grey and medallizer is searcedy appeared. Aeronding to some, the brain attains its full weight and size so early as the fourth year. The texture of the brain of the negro has always appeared to me different from that of the European.

PART X.

OF THE NERVES.

580. The greater number of the more important nerves have. throughout the rarious preceding sertions, been described so much in detail, and the mode of displaying them so fully explained that all now required here is a systematic summary of their origin, course, and distribution. The survey form two great divisions, vir. events apinal and sympothetic. The eranicspiral are further subdivided into cravial and spiral; the entrial may be still farther subdivided into server of special assessor, arries of notice, and common moto-sentient novers. The spiral perves have double roots, wir. a motor and a sentient; of the crucial, some have double roots, others single; these will be more particularly specified afterwards. Some moves are assomated in a pacticular manner with respiration, and are therefore called respiratory. The spiral nerves pass through the furnishes conjugation in parts; the crunial, by various apenings, through the base of the examine. There are that your pairs of spinal nervos, etc. eight cervical, twalve thread, five lumber, six earral. We shall examine them with reference to, 1st, these common characters; 24, the regional; 2d, infividual, 19, They arise from, or terminate in the spinal marrow, by a double linear series of filaments or room; these are unterior and posteriar, se ganglionar. Beyond the ganglions the asterior and posterior roces unite inerpenalty; the truck resulting from the proceed three sets of branches, siz. posterior spiral, anterior apinal, and brouches so join the gargions of the great sympathetic. These characters are common in all the spinal nerves; the first cerrical pair, called sometimes subscriptual, soldium offers any exception.

581. SPHAL NEEVES. The permissities of these nerves, with

reference to reputs are, list, in the errors of pairs the column of the pasterner roots is to the arterior as three to use; they increase generally from the first pair to the fifth, and mantain that increase to the eighth; the first pair has the pasterne roots force in sumber than the arterior (Ash.), and is said to be frequently without a gaughter, but in no metacor have two remarked this. The derial pairs of spinal nerves; with the exception of the first, they are nearly count is solutine; the ricots are slouder. The lumber and durant orders are characterised by the great number of filaments of anying the extreme elestrons of their ergins, it has even been said that the automit as well as the posterior roots pass into the gaughen; early, the great length of their course within the spinal canal. The real control extensity, to urigin of the filaments

from the spinal microw is not known.

APP. L. POSTIGUES BEAUGUES OF THE SPINAR NERVES. These branches are met with upon the posteroir region of the trunk; they are very early disserted, and us they proceed to the integrments, and to muscles already known to the student, they do not require any tedious description. Iv. Posterior branches of the operical survey. These are met with shiefly between the elempterns and semi-spinshs colli, but many of their cuttimings branches are met with pressons to this. The pusterior branch of the first, leaving the minum by the space betives the occipital lone and arise, close to the vertebral arrery, and under the receiv capilla posticus major, ofcimately supplies with branches the certis major and minor, obliques informer and enperior, and by a ramus anastomorphics, noists in forming a port of pleans, perently called the posterior exercise pleass. It sends no branch to the great complexes. Posterior branch of the second extinctly pair. The largest of all the posterior homeles of the cerrical nerves passes under the margin of the inferior obliques. and proceeds upwards to the occupital region and the scalp. traverses the great mundeup and trapezion, and follows the course in part of the accepital attery. At supplies branches to the great oblique, complexus major and splenius, the trapezius, and finally, to the larry scale of the occipital region; the occipital muscle is said may to receive any homeness from this nerve, but to be supplied by the lacial. Protester branch of the third servical pair leaves the cause between the transverse process of the second and of the third cervical vertebra, and proceeds transversely inwards between the complexes and comissimalis cult. New the inner margin of the complexity, it divides into two entaneous branches; one ascending, the other horsontal. The first, sexual, and third pairs of cervical acryes likewise form personally a plexis, situated under the samplesus, close to its external attachments a some large proposed calling this the gasownior cervical plusma; it is not very remarkable, nor of countaint occurrence. The posterior branches of the fourth, fifth, sixth, seventh, and eighth curvent pairs are much smaller than the preceding, and decrease from the fourth to the seventh; they

send branches chiefly to the semi-opinalis rolli and dorsi, and to the secretaries.

583. POSTERIOR BRASCHES OF THE DOME-SPOTAL NERVER. Those of the first pair are almost identical with those of the last curves the posterior branches of the second, third, fourth, fifth, sixth, seventh, and nighth dorsal nerves greatly resemble each other. They all leave their respective forming required external to the semi-spinalis muscles, and there divide into two branches, one external or muscular to the mem-lumbate and longuations dorsi, the other musculo-cutureous, which, after reaching the integuments close to the spinton processes, moved towards the region of the shoulder. With respect to the postsnor imaches of the ninth, tenth, eleventh, and twelfth denospiral nerves, they procisely resemble these of the loins; they have no museulo-citanerus branch, like the preceding; they supply the shibminal walls. The posterior branches of the linehar across diminish gradually from above documents, the list being very small; they supply the adjaining soft parts. The posterior brenches of the sacral nerves new extremely small; they decrease also in size, and supply the semi-spinalis bumberum and adjoining integuments.

584. II ASTERIOR BRANCHER OF THE STRAIL NERVES. There are the true continuations of the nerves, and supply, let, the lateral and anterior parts of the trunk; 364, the pertonal and petran extremities. Besides, these nerves form two great pleasant, with the cervice-bracking, and the lumbo-secural. These have, of late years, been subdivided into four pleasants, viz. Cersical, Hospital, Landow, Secret; this arrangement is striffend, but correction, Landow, Secret; this arrangement is striffend, but corre-

ment for description.

388. CERVICAL PLEASE. The Asterior broach of the first personal pair, joins that of the second enviscal pair, which subdivides into two branches, an according to join the proming our, and a descreting, which joins the anterior branch of the third cervical poir. This is much latter than the proceeding, and chiefy forms the cornical please. It will readily be found hehird the appear part of the stemm-marting muscle, omicsponding to the bearing emporale, between the seroud corrical vertebra and the third-It divides use an ascending and descending breach. Its ascending branch biforcates on the posterior margin of the sternoemercial muscle, and anadomnsing by one or two Daments with the second corosed pair, forms the manual never, and the reperficial certified and execution corne. We shall speak of these nerves more particularly, after having described the plants fully-The enterior locard of the fourth cervical pair, hesides formshing the phrenic, anestomines, but not directly, with the third cervical par; and thus these four, by a stemming, constrains the overword please (475)." This please is estasted on the anterior and batern) pents of the four first perviral vertebra, under the posterite margin of the sterre-sleido-mastuid muscle, external to the in-

[&]quot; Deportally the founds pale contacting a mobil breach with the fact.

ternal jugular wein, and between the nextus expitis materia major and the revived insertions of the splenius and became angula scapula. A deep layer of the coroical fastis invests it closely. The branches arising from it are:

Du. to the levator ang-

1. Asterior. The superficial servical.

The great masterial.
The steal reacted.
The steal reacted.
The steal reacted.
Superficial.
Super-cardenian.
Super-cardenian.
The inner descending branch.
The phrenio.
Branches to the imperior.
Dr. to the risenshife.

586. The method of dissecting all these nerves having been strendy discribed (475), it is only mecessary here to speak of their ultimate distribution. The Superficial Certiful (operfic. coli) crosses the external surface of the sterno-mastoid, beneath the lationisms colli and external jugatar vein; it supplies the integuments of the clea and of the space immediately beneath the lower jave, and sends an anastomosing limitch or two to the facial. It is therefore chiefly a retenesses serve. The great ownfield, the small remaind, and the surricular founties of the cervical picaus are sesentially cutaneous nerves; their names will tuggest their esume. The supre-christian and supre-occurrent are also escontially estaneous; they supply the integaments of the shoulder and upper part of the thorax; they are situated supersonly beneath the cervical facia, and between the omo-byordens and renions, but, inferrorly they cross the clavicles to become commons. The steep or inner descending branch is usually not much attended to, and is yet a very nemerkable branch; there are often two they form, with the descendens noni, a please, from whose convexity arise filaments, anpplying the sterno-hydren, ome-hydrica, and sterno-thymrides muscles-The please his anterior to the deep jugular year. The phrene branch or nerve has been already very carefully described , in its course it prestomeses with the sympathetic, and with the fifth and exth corrical pairs, accasionally gives off a cutaneous branch above the slavide, and ultimately is wholly distributed to the displingm. Finally, the profound muscular branches from the cervical plexus supply the trapezous, lesator auguli scapular and shomboides; they assistences with the spinal accessory of Willia.

387. Bracutal Plane. The enterior branches of the fifth, sirth, strenth, and eightf pairs of the Cornical Nerves are of large size, are situated between the scalenj, and together with the arterior learnth of the first pair of dorsal serves, they from the brachial planes (217). The plexus is formed in this way: the fifth and

sinth pairs unite together, the seventh proceeds by itself, the nighth and first decad unite together. The situation and the connection of this places are as follows; at its origin it as placed between the scalesous antitus and madius, and above the subclassous artery, a strong layer of cervical facta conductes a completely from the surrounding parts; hower shown there lie in front of it the chariele and subclasion movels, behind it the free ris and only the upper part of the sensation magnus; still lower it is situated in the bullew of the axilla, resting to the tendam of the subscapulars muscle, which argumes it from the charile joint. The hunches formished by the bracking places are easier of innection, provided it he done after the clavele and subclarge muscle have been cut through. They may be divided medianically into three sorts.

1. Those which the pleans furnishes above the chylele.

 Branch to the selectavine. This branch americanines with the phrenie.

2. Branch to the levator anguli erapula-

ik. Branch to the rhomboid.

 The posterior external thoracie to the serratus magnus, (the external respiratory serve of Bell.)

5. The super-scapalar to the sours and infra-spiraci innacles.

6. The superior exbeoquilar hmach.

- II-Branches which the pleases furnishes an a line with the claviely.
 - 1. Great personal nerve. | Haternal auterias thuracie 2. Small personal nerve. | nerves.
 - III. These which the plexus furnishes in the arilla.

1. The axillary or circumflex.

 The subscapular braiches, comprising Branch to the batterium store.
 Branch to the term major.
 Inferior subscapular ocree.

Of all these branches, one only proceeds from the front of the plants, all the rest came from behind.

IV. The terminating branches of the bracked plexes are five in number, via

I. Internal cutaneous and its accessory.

2. Muscula-cutanenus.

3. Median.

4. Museulo-miral, or radial.

A. Ulmar

Of these serves the only one whose oblimate distribution has not been alliated to, in the executifies to satillary. This supplies the delimites and teres miner, and is a remarkable nerve in every resport.

ASS. The TEXAMENATION BRANCHES OF THE BRANCHES, PLEASE, better known as the nerves of the superior extremities. Those acquained with the musiony of the musics (229, 262), can experience no difficulty in tracing these branches to their obtained.

distribution: 19, The Internal Circovous, following somewhat the course of the basilic vein, divides about the middle of the arts jutg two limethes, a rabital, and an epitrochicar or pra-The cubital, which is also anterior, proceeds in the course of the reedan busile vein to supply the integuments on the autorior parts of the fore-arm. The spitrochlour branch supplies the integuments along the back of the foresmit. The acrossory housed of this internal cutaneous is a fine nerve, deficult of dissection. It stones from the back of the brackial plexus, and from the trunk resulting from the union of the eighth cervical pair and first dorsal; and descending through the exiting upon the wales of the thorax, divides into two branches, an external and an internal. The external may be followed scross the united condons of the teres major and laissimus does, vertically to the integrments on the juner side of the arm. The internal, up the other hand, amytemoses with the second intercostal branch and then follows a course pretty similar to the external, 29. The Manuals-Carnasons, also called the perforating acree of Casser, from its fraversing the comco-heachings muscle, supplies, in its rouse along the arm, nerves to the caraco-bracking a muscie, to the hiceps, to the brachialis flexor, to the articulations of the elbow and wrists, and finally, numerous entaneous branches, 30. The Medica furnishes no brough in its course along the ann. In the fore-um it gives no nerve to the skin, but supplies all the muscles of the anterior region, excepting the flexor carpi almaris, and the hour half of the flexic profunds. In the hand it supplies all the cutaneous nerves to the palm of the hand, the digital branches of the thinnis, face-finger, middle finger, and radial side of the ring finger; fishly, branches to the short muscles of the thumb, and to the two external lumbrirales. 40. The abox same. This never should be examined in three different sections, a brachief, an antiferachial, and palman. It furnishes no branch to the arm, but in the fore-mu, a cataneous branch; and moreover supplies the flexir carpi ulture and inner half of the flexor profundus. In the hard it farmshes a doesal cutaneous branch, whence proceed nerves to the little forger, ring-fuger, and omer half of the middle finger; also a palmar cutateous branch, which gives brambes to the little funer, and ulsar side of the ring finger. Lastly, a muscular branch which supplies the three muscles of the hypothesia emissions, all the interessed muscles, and the two internal lumbricales 5". The Mancalo Spiral nerve. This nerve whose course is an remarkable, famishes in the arm two cutaneous branches. It also supplies the tripps and apponent; in the fore sem, noneralar branches to both layers of presches situated in this pushesion region; in the hand it turnishes the slored nutaneour branches of the thouse and index firger.

569. ASSTRAIN BRANCHES OF THE DORSO SYSSAL NEAVES. The outsidens branches of these nerves are difficult of discretions but all the larger branches are easily found during the examination of the innerior of the thoras. They are twelve in number, and are distinct to supply the walls of the thorax and of the sh-

domes; but they do not alone supply these parts, more they also receive branches from the bracked and lumbar plexus. These nerves may further be subdivided into moscular and cutaneous branches. The anterior entriescus perfunding branches am extremely small; they pass through at the sides of the sternum and lines alba. There are also mislife perfecating curateous and posterise perferating entaneous. The autonor transless of the dorso-spinal nerves here spoken of greatly resemble each other in their anatomy; separated from the posterior branches by the supenor costu-transverse ligament, they reach the middle part of each intercostal space; here they are situated between the pleases, and an apaneurous extending from the termination of the internal intercostal muscles to the spins. They next pass forwards between the intercional muscles themselves, situated always inferior to the corresponding actories. But about midway between the vertebral column and sterrum, they oil diride into two branches, one commence or perforating, the other proper intercontal. This latter follows the original course of the nerve. The first pair of dornal nerves differ from the others in this, that by far the greater part of it proceeds upwards in front of the neck of the first rib, to join the bracking pleans. Its proper intercestal brunch is very small. The second intercestal is remarkable for the great size of its perforating or cutmeous branch. which crosses the axilla to supply the integuments of the arm. It anastomoses with the accessary of the internal rataneous, and receives generally the name of the superior interconculument serve. The third is also remarkable for the size of its entangues or perforating branch, which also proceeds to the integuments of the arm, and is called the inferior interrupto-humeral. It escapes from the thoma between the third and fourth ribs. Of the inferror interesstals it may be said that they are as much abdominal as thomeis. They supply the integrossents of the abdomen, and send branches to the recti and obligat muscles a branches also to the transversalis. It has never yet been shown entionally, how these nerves and the mancles they supply, sympathise with the organs of respirations

500. Luxuran Parsun. The dissection of the mission bounds of the Luxuran Parsun has been already described (411, fer.) in speaking of the abdomine ravely and its outern. These who understand the sentency of the pains mercue, and parent qualification for lumberant, and illarun, will experience no difficulty in understanding the matterny of these nerves, any in tracing their ultimate distribution. They are fer in number, and so named first, second, third, found, and fight. The first is the smaller, the fifth the largest. The lumber plane results from the union of these with each other: It is situated at the address of the besties of the lumbar vertebras, and beneath the origins of the press magness. Three large nerves present from this please, such the Crared, the Obserbar, and the Luxur-Serral. Four other strader nerves also present from the same please, we the life-serval, the middle musculo-currency, the inferior musculo-current, the middle musculo-currency, the inferior musculo-current,

tanenos, and the genito-cruest. These nerves are easily traced between the periconsum and putts, qualrams lumberom, and illians. The same of macelo-calmeda given to them by Riclear has been objected to, but not on good grounds, since this is really their destination. Of the three great perves which proceed from the sumhar pieces, the Luste-Server's not properly a nervebut rather an intermediate mergous communication between the tumbur plexus and the speral plexus. It is formed by the autonot branch of the fifth pair of lumbar nervey, and a division from the fourth. The Obnauer Nerve, after presing across the pelvis. but close to its walls, leaves this eavily by an opening in the obturnfor membrane, and thus passing non-the thigh, sends bounches to the obturator externus, to the three adductors, and to the gracilis. There generally areas from this nerve, a branch which mastomoses with the nervus suphenus intronus. When precent, it will be found below the pectineus. It is said by some actusionally to pass over the horizontal rimus of the pulis; and this variety in its course may be a reason why it is not often observed. The Crural Nerve, and all its branches, have already teen described in the dissection of the lower extremity; but it may be suchi to sum up here the principal points in its distrihuman. Within the prive it has embedded in the peaus, sending branches to that muscle and the mactio. It next proceeds under Pouport's ligament, at the distance of about half an mehon the than side of the femoral aftery, embedded in a groove hetween the prons and thisens, and here suddenly divides into a great number of diverging branches. These branches, which the student ought to trace with care, are, first, the musculo-extensions branch; this amplies the surtorius. Secondly, a small branch to the sheath of the temoral years! Thirdly, a branch to the rectus. Fourthly, branches to the vastos externs. Fighlies branches to the vastus intenus and crumers. Hathly, the long taphenas interiors, which also cons a considerable may in the climth of the yeards.

591. Sacraat. Placers. The outerier brenches of the sureal series compose this pieces, and we have already described the mode of dissection, and the distribution of those nerves, as our account of the privis and public extremity. A systematic summary, therefore, may suffice to sampless their bisney. They are six in number, and excumulation, as they leave the amorter sexual formulae with the sexual ganglia of the sympathicity servers. The first pair, which is very large, descends in front of the pynomidalis muscle, uniting of an arrate surfer with the lumbo asseral nerve. The second pair is as large as the first, and committees with it to form the sacral placers. The forth pair is separated from the second at a considerable interval; it is much smaller than a; it also joins the places. The forth pair is separated from the second places. The forth pair is not complicated, though much smaller than the their. First, it asserts in forming the useral places. According to make several branches to the first pair. Forthly sends transfer to the mention to the mention.

cocygous muscle. Finally a parameter branch which trusteress the long acrosscratic liganizer, and the origins of the gluteus manitate made. The fifth and sixth pairs, according to some, have nothing to do with also moral pleans, correctiones, the fifth pur sends a branch opmanle to join the fourth, and a descending branch to jon the with; this last, which is extremely small, sends Blamerts through the summaristic lineaute to the glutow magi-The sairal pleans thus formed rests on the internal surface of the pyramothis source, behind the hypographic venicle. The branches which are from the please me as follows 17. Piscoral Bounday to also rortum, bladder, and in the female, the cagers, pertina, and bladder; these neaves rome from the lower part of the sarmi please, and several proceed to the hypogentee pleans. P. A knowle to the legator and, "I'. A branch to the obtarator internes. 4". The deep padic nerve, following the course of the internal pridic arrary. These branches are mortly The posterior branches from the sacral pleases are 1" The Normal Chilese Separate, which learns the pairie by the maper part of the great scattle notely, and suppose the giptens medius, minimus, and tenant facin late. 25. The Aircraft Glober Johnson, or Small School Neves of Bietrat, which leaves the petris by the scratic needs, beneath the pyramidelis along with the great scratic; the muscalar benedies of this nerve go the glateus maximus; the cutations branches are large and very remarkable, particularly one which gues to the account in the male, and the greater labia in the female. 3". The nerve of the pyramidals muscle. 4". The serve of the genelins superior. 5"- The nerve of the quadratus femorie, which also supplies the genellos inferior 6". The Great Scienc Nerse, whose course has been very carefully described in the dissection of the lower extramity. We shall here, therefore, merely enumerate its branches. It supplies all the muscles of the posteron region of the thigh-Its fibriar division supplies the muscles of the external region of the leg, the muscles of its anterior region, the integuments a plan of the external region of the lest, and of the decoal region of the bot. By its tileal denome it supplies branches to all the musries of the posterior region of the leg-the integraments of the inner and outer side of the beed, and of the external dornal region of the forc. Moreover, by the internal plantae serve, which is a branch of the practice ubial, it supplies branches to the Beaut here's communis, to the two first interneced and to the two first lumbricales, to the integrments of the internal plantac region, and the digital huncles of the first, second, third, and one side of the fourth the. The external plantar, which is also a bounch of the titial, furnishes filaments to the mustles of the external plantar region, to the flexer to be my, to three interestal, and two external lumbricales, to the abdition pulleds, and transcersus priis, to the integements of the externe placture region and finally, the digital lamelus to the fifth too; and to one wde of the fourth,

there Or one Canasat Natives. The council veryes per-

and once pales, recoming them in their numerical order, proceeding from before backwards, communing with the oblistary, and terminating with the bryanglossal. This method is generally adapted, but all the perves bare other as a which we shall never in speaking of the individual poins of invose. The medification introduced by Sceningring was not a good one. The analogy leatment the preservoir number of the cranic serves, and the spiral nerves, is admitted to be very great.

in 3. First Pain, or Otracruny. These percent if they really be so, come from or communicate with the america boxs of the leain, at the base of the fissure of options, and in front of the adottonin perfectly, one of its room was liven supposed to some from the middle labe. After passing under the inferior surface of the antesior labes of the brain, those terrees approach each other, and form on the cribinium plate of the ethnood a ball, from which the true objectory finances these end to the pituitary membrane of the mass.

364. Sucross Paus, or Owne Natives. These commence in the corpus periodition entersion, and therefore from the chalent optics; they afterwards decrease, and form the chlosics; diverging from this, they enter the orbits by the formulas optics, to form

altimately the return of each eye-ball.

595 Threst Part, or Occas sorman Comment. There are we arise by five filaments from nervous cords intermediate to the course cords, and from a little fossa between the poss and the talercula marifalaria. There course to and in the critic has been particularly described. It seems branches to all the models of the eps-ball, excepting the models for and receive externors. It also sends a remarkably storing branch to the lenticular gaugion.

2005. Formus Path, or Partierro. These nerves come from the sides of the valvule of Vieusouse, and after sending a branch to

the lachrymal nerve, supply the trochleator muscles.

387. Forms Paraner Tairaman, is a double move having a motor rost, and a sentient or ganglionic root. The larger or sentimet root, composed of nearly 100 filaments, arises from the external ide of the olivery body, or in other words may be traced through the protabenasce into the medalla oblasgata. The origin of its motor cont has not been well made out. Within the cranmen, the fifth has a gang on upon its sentient or larger root, aganglish of Casset), the anterior root passing over the ganglion, but not uniting wish it; the nerve then subdivides into its three great divicions, viz. the ophalminic, superior maxillary, and inferior maxillary. 17. The Ophthologyers of the following branches, lachryreal, fractal, massi; connected with the most is the leatinular enuglism. 25. The Soperin Marillory sends of an orbitar branch; the nerves which are consected with the ganglion of Meckel, viz. the palatine, splings-publing and eidne t the posterior and entetion abreala dentar; for ally, a few illaments envirging the interest maxiliary array. The superior maxillary reave terminates by breeming the infra orbital. All the branches of the ophthalmic and

cure our maxillary are supposed to be sentient nerves. At The Interior Maxillary configure both mater and sentient filaments, because the mater man a decreased by Palletta, join with it as apparelly, and according to from a the branches of the combined acres are, those external transfers, via the performal transposal, the transfers, and based; are performer, the internal propagal; two fatows, the largest and the agreest dealer; finally, the six property is placed on the trunk of the series.

are several Pain, or Excenses. Mirror, arises from the fur-

ingoed obtimately to the rectus oruli extensis,

200. Severty Pain, (Pourto Dona and Pourto Moran), to exidently formed of two distinct nerves. The Facul or Firther Diou is evidently a nerve of motion. It comes from the anterior and infernor part of the restiform bodies, and, arcording to some from the facinit eminimati which he between the excess restitions. gove to the posterior median dissue of the medalia obinerata. The norse passes into the means internos, and through its cribeform place into the runal of Fullspins i it here weeves the vidian, and whilst in the manal, gives all the media tympani. Whilst in the mastos internos, it receives some however from the auditory. nerve, or portio modis of the seventh. Having left the careal by the foramen style masterdeem, it gives all the following branches : posterior surrender and styloid, next its terminating broadnes, or tempero-facial arancle, and perviso-facial branch. These syread out upon the first, having passed through the parolid gland. The facial surve supplies branches to all the entangent muscles of the cranium and face, or muscles of expression; also some cutarooms langeles; lastly, farms oumerous amoranous with the branches of the fifth pair. The distillary Nevec or Porto Mollis, is distrihorad in an especial manner to the laberouth of the ear. (The exact anatomy of these roots which lay between the analogy and facial, and which seem to come from the glosso-pharyngeal, or survey vague, have never been very accountely determined.)

DOI. Excerts Paix or Parrino Gaerras, compacts three Eventua: The Glasse-Pharyageal; Nersus Vegus; and Spinal Accessory. In one sense they are all defect nerves. It. The Glasse-Pharyageal; and, 25. The Paramo-Gaetra or Pages have a common restre origin from the corpus conform. 35. The restrict neighbor of the Spinal attractory is from the lateral parts of the carried rep on of the modella, between the pesterior and america reads of the spinal serves, and behind the liganization demann. In leaving the cranical by the foramen lateral posterior, the glosse-pharyageal is most anterior, and has a spinal accesses, the glosse-pharyageal is most anterior, and has a spinal accesses the previous gaetra and spinal accessing pass to

settler.

The Gioun-Pfergoped has un it a ganglan (of Andersek) as it passes through the francies become, always more distinct on the burser snimsle than in man; the ganglion (couples a small

[&]quot; For this and other reasons which must not be overlayed here, we have any

depress or in the pors petrom of the temporal burn (recupbentum surple petroo). After this, the name seasons was the sock, hetween the etylogismus and etylogisterangens, and poureeds to the maximi membrane of the torque. To its passage it furnishes, 11. The branch of Jacobson, connerting the glesso-phargraph with the superior serviced gaugilion, the spheas-pulatine and the one. 25. An envelonosing branch with the face. 45. A communicating branch to the spinal and nervus vagus. 4% A musrular insuch to the aligastric and stylo pharyngess muscles. 5% Carotal Caments. 81. Pharyageal branches to the supersur and middle constrictors 7% Tomothe branches 8% Lingual branches. These all proceed to the mounts membrane calls:

The Preventuries or Nevent Vanue, in passing through the farance bearing forms a garglion, " (parglion of the pursuamatric of the apreal sevening unites with the ograns ragus beyond the gaughter. From the garghin proceeds an amotomosirer branch to the facial of this branch has in the ingular The premin-gottle peat receive in masternesing Distance. branch from the spiral acreasing; a seconsected also with the hypo-glossal, with the glosse-planyageal, and with the sympa-In the nerk, the preumo gattre a situated in fruit of the vertebral rollims, between the deep carolid and been mal jugular, and in this sheath of those vessels. In its course it fareshes, I'. The nerves pharyagens forming the playment places. 20. The septror large part agree; this nerve is distributed to the murnes membrane of the layer, and to the enco-thresidsua muscle ; it seems also to send a filoment to the aryteroid tousele. at The cardiar learning of the promon-gastric eary in number: they leave the trunk of the posume-gustric at different brights, and join the prepar excline nerves of the sympathetic. In the thorax the posumo-gastne gives of the inferior larynged or resurrent; - a cardiar branch; - trachest or pulmonary branches; and asophagyal branshes, also the anterior and poster or pulmorary plexus. The recurrent or inferior brynged werves winds around the arch of the north on the left eate, and around the sub-clavanarrive on the right side, and percent operards to the larger. They are distributed, 11, to the guillet, tracker, and to the inferior constrictor of the pharpax : Ti, to all the muscles of the largue, excepting the enco-thymid and the extrinsic muscles. The assertor pulsationry branches to front of, and crossing the brenchial and pulsations monary actions and rains, are usually called the antenor pulmonary.

Viguence allichments.

mently marrial end the opinion that the glassic pharyword meter is in man annelly. retire of seven and that a Basicion from the couple for is the typer mineter in fabor, for comple, it decises to the new for early in fabor, for comple, it decises to the new of the public, is them, therefore, the parameter depicts in probably mostly control.

"When the arribes of the early decision is probably mostly probably in the public of the posterior contricts of the public of the pub

I This tennes is remarkable torgette the home, and explains perfectly why the facial sever decold representation over the large, and are subtrict, some present the hypothesis of the Charles Hell regarding the respiratory nerves of the

plexes. A more numerous set of filaments proceeding behind the branchial takes, assist in forming the passenur pulmonary plexes. The greater number of the branches from those plexes tollars the lume-had relies into the lume. The news years wage next gives on numerous emophageal branches, and then proceeds into the abdomen by the re-sphageal statics of the displanarm. The right is posterior, the left antenor to the paller. These serves apply numerous filaments to the stomach, but it is a great error in physicalogists in suppose that they are instead to this , on the contrary, the right emostrates one of the great origins of the arbor plexes; the lost sends numerous branches to the layer.

The Spisal storescy coses, as mentioned, from the quital marrow, and proceeds into the contour by the foramen marrow of the occipital boxe; a alterwants leaves the cross may be formed formed formed poweries, and unites interactly with the prount-gastris. The new a ultimately distributed to the cerum-matter, the traperties and to the pharyer, and in our openies forms a great part of the superior larrageal perces. It has been also

called the asperan respiratory serve of the trunk.

60). The Nexts Pain, se Hyso-cassaat, uses from the factors between the anterior pyramets of the obvary bodies of the medulla oblinguts; it seems evertain that the filaments of unon do not rome from the pyramids. The hypo-plosed leaves the eranium by one or two divisions passing through the farming candyleides asserious, they descend vertically in the neck between the uternal carotid artery and internal jugaler veing its further course in the neck has been-already described. It amount muses with the nerves vague, the superior cervical gaugion, and with the first and around pairs of covered nerves, afterwords with the more gustaturas of the fifth. It sends of 1s, the menus descendens, which forms a real please by mount of its anatomoses with the first, usood, and that pairs of cerrical nerves ; 2°, a small museular hunch; 3°, branches to the hyp-glosus and style-glosus. From the please frenced by the discendent noni, branches proceed to the uniq-byridous, thyrohyaideus, and stemo-hyoideus. The ninth pair ultimately terminates in the latricese muches of the fungue.

602. The Green Symparmical, A very extended view of the system of moreous is not necessary here, instanced as puch pertinn of it must already here fallow under the sendent's attention repeatedly while dissection the head and merk, the thorax and the abdoness. But it moved understacing to highly advertageous for the more advanced student to dissect the system of nerves apon a young subject, giving to it for the time his exchange attention; under these communicates the following summary may be found useful to the dissector, who by this time ranged sequine any particular directions for tracing the nerves. The great sympathetic collinal also System of the Complement, System of the Nerves of Deposit or National Life, Properties System of Nerves calendaries are such taken the regreshal column, from the first nervest critics to the late

eneral or even energical; it extends also formants quite to the orbits." If is composed of two extended conts (on each side), interrupted frequently by ganglious plared upon them. These cords then, are formed of gauginos, and of their communicating bracelos. From these garglions arise filments which mith with most of the anterior branches of the spinal nerves, and more reperially with the motor routs of the nevers, but necessiing to some with both sers of muts, and they send mimerous branches to most of the thorseso and abdomeral viscous.

CERVICAL PORTION OF THE GREAT SYMPATHETIC. Superior Corning Complion situated in front of the second and third certical serrebne, and upon the rortus antiens muscle : from this gaugien a branch passes appraids into the earotid ental ; this branch divides into two just as it cures the carel. and by their interlaring, forms a please in the cavernous sinus, whenes proceed branches to the sixth ermial pair always, and atmetimes to the Eith. The same branch souls a filament to the vidine, and then reaches the ganglion of Mockel, for both branches of the value come from the ganglion of Meckel. This branch is called the inferior branch of the viding. The covernous plexus is estanted to the inside the carotial artery as that vessel is about to enter the cavernous sings. From this porcus arise filements which may be traced to the third pair, to the leoticular ganglion, to the fifth pair, and finally those which accompany the carotid artery. From the superior cerrical ganglion, pass its anterior beauches communicating with the glossi-pharyaged and pneumo-gastne nerves, and with the hyper-glossal. By its external branches this ganglion communicates with the first, second, and third pairs of cervical nerves. By its inferior branch descending in the need behind the great vessels and inferior thyroid artery, if communicates with

The Middle Certiful Genelica: Its internal branches are ditided into those following the branches of the external carotidartery and viscoval hunches, viz. the pharyogeal branches, the largugeal and the cardisc. The middle cervical gaughon is frequently wanting, in which case the ramus communicase goes on the inferior cervical ganglion. Haller called the middle cerviral ganglion Physoid, in compagners of its being generally placed in close unon with the inferior theroid artery. When this gangion exists, a communicates of course with the one above, and the other below it; externally with the third, fourth, and fifth errocal pairs of priving. Internally a given of the motive or great

conflir nerve of Seamu.

The Inferior Commed Gampless is very constant, and bultures as much to the thomas as to the neek, is hone placed in front of the transverse process of the sessoth cervical vertelms, and the head of the first rib, and behind the seign of the vertabral.

[·] M. Crorelffton days and affair marghaby propose, tor this afea is coupled. s place, and says promise experient.

actory. Besides the runi consumication it gives of a branch following the verifical energy a communicates with the will, seventh, and circles correct pairs, and non-times with the first droad. Other franches pose in front of and befored the objective array families a nervous ring or loop, these join fast the thouse gaugine; family, it usually gives off the inferior confinences.

Canreas Neaves and Plance. Before proceeding to the despecies of the therete parties of the sympathetic system, the discretic may follow the westbral and the conflar nerves. Trace the Vernhrol Nerve through the const he the vernelval musty which it follows. Mr Crureillhier thinks that this flament connects the infestor resvent grouplum with the third, fourth, and fifth years of everyical nerves. The Caroline Norwes, right and left, arise from the errowal ganglion; they are joured by some delicate filments from the procurage strict. If traced ato the thorax they will be found placed upon the origins of the polynomity artery and north, there forming the carding please, from which present the cummary plexus, following the course of the commary arteries, and after leaving these distributed to the morniar towns of the heart. These veryes present remarkable varieties. The right superior randian curve is usually placed behind the summan executed amony, and describ, growing the inferior thyroid, next penetrales imo rise the new belongs, but sometimes in Boart of the subclavian arriver; follows the estime of the brachin cephalic artery, and thus regules the posterior surface of the neck of the agent. Here they manumose with the left cardiac nerves, and then join the rankac piexus, The winds confect were of the right side mores from the modifie record parglion when present, and when sheart from the coult of the sympathetic strell, then the largest of the conductorress; it proceeds to join the careine plexes. The deferior right confar serve comes from the inferior cravical peoplism, accompanies the middle earder, and descending with it is finite of the territor, terminates in the cardine please. The left cardiac nerves differ a little in their arrangement from the right cardiac, but not in any essential poons. In the outline please, which move divide into an anterior and protorior, there is generally found a guigliou ar turns they are placed shouly to tween the corts and the right branch of the gulmmary miory.

Out. The Turnance Pearton of the Gener Sympathy remmes of twelve gauglis and what them one of excument about. The
could thus have do not the thirty, external to the plusray, crosses in the course the healt of the rile, communicative
above with the not certified gas glain, and below only the first limilist. The interviewd arrays and relian past halo of the could gas
the sayare with runs parallel with a. The branches processing
from the parton of the great sympathyte are external and invested.
The external are precedily two for each sungition, sinch it recourse from or sense to the decreasing fortenessing increases
the interpolal canceless of the second, thou, fourth, and fight on the

theracic gargious proceed either to the walls of the aceta or to the pulminary please; the internet beauther of the sixth, severath, eighth, nints, teach eleventh, and treefth suite to form the splanetons nerves, these are usually turn in ruch side, a large and small-The larger is formed by branches from the sexth, accroth, eighth, and minch, his sometimes also from the fourth and fifth therapic grangling these units to farm a considerable trunk, which after deterriding in a sloping manner near the sides of the vertebon, the vents anygon and thosacie duct, got into the lower part of the posterior mudiastiones, and pass through the displiragin generally by an opening perular to themselves, and getting into the abtoneo, The smaller splanchmic follows into the semimor gargion. protty nearly the came comes, but generally pens the renal plexus. The semiliour gargian and man plexus, although placed in the abdomen belong is an express! manner to the theretic portion of the creat symulatic. The user is composing the pleans are placed in the stability plant of the body amond and spon the collac artery and above the procreas. Both the great splanchines proceed asan its larger portion, wetally called semilurar gauglion. He form is an inventor as to dely description. From the selar pleans prooned as from a rentro, picroses following the source of the following arteries; Disphragmenter, Coline, deciding into coronary, hopetie and aplenic | Superior Mesentene, Inferior Mesenterie.

604. LEUFEAU POSTION of the GREAT STREAMETICfurther ganglia are four or five on each ode, placed upon the ades of the brains of the landor vertebra, and to the inner side of the point. They of course all communicate with each other, and with the last decal and first sacral gargion. They have also external and reternal boundary. The certained hold the same relation to the hundre spital torrest, as the external branches of the theracic gaugita do to the diescopinal nerves. The internal branches must be forming the inferior measurers please, and moreures constituin the aurite pleans, also the hypogenitio plexus. There are two Augustates plasmes a right and left. They oremmy the lateral and seferior part of the rection and bladder in man; and of the restam, vegue and likelifer a warrant. These plexuses (hypogestric) receive filaments from several other sources, and in an asystem manner from the enterior branches of the sourcespinal nerves, and from these are given off the following secondary, premises fallowing the morse of the arteries, tra- homorrhoidal.

veniral, varinal, merine, technolog and orange.

605. The Sacran of Person Pourion of the Great Systemtention. This contents of a source of gaugin and their emoceting disaments placed in front of the usual recreices, and helpful the rectain, generally four or number no each cate; the system annully perminates by on anothernous authors on the right and left, appropriate comits on the interior number or the first congress exterior; at the poors of union there is annully placed a small gardenium the growing impair. The serial garden is respect to when hereachers, resemble the other particles of the system.

PART XI

OF THE ORGANS OF SENSE.

60%. The Ornary or Sixer (informatio appears) for five is number, viz. Skin. Touch / Tougue, Touch / Nove, Anall : Eyes, apply : Ears. Heaving. They are the matriments which pit true is relation until the exercisal world, and make him acquaintal with the properties of matter. They are, is short, the means by which we acquire all our knowledge, and without them them would be too beethers.

606; Sexse or Touch. The Sais, or common external Israothers real the body, is an extremely complicated insulvane, of great extent, continuous with the murous membranes, or internal integunionts as they are sometimes called, at the mouth, area, posito-nrimary organs, &c. Its correct embysis was first made by Dhibright. The older abstomats used to commence their descriptions of the human structure with it. The skin is both a sensitir and a properting membrane. It is an organ of prosperation of somtion of same peculiar doids, and porroser, in some think, of its halation. Thus, performing so many distinct functions, it countd but he very complex in structure. The integuments present two surfaces, a free or external, and a fixed, adherent, or internal, Upon the free surface may be observed, 19, folds and furnisms. T. A colour varying arranding to the mass of men. 3'. Hump appendages, as mile and huir. 3', Small openings, by which escape the various products of sycretion, and particularly the prothiers of the selections crypts and the inhaled fluids, also for the passage of the him. By denieting the skin we espece its fixed earlier. Beneath it, in some places, there are enumerous musottlar filtres, such as the palmers tervis, latissimus colli, &c. bur there is not properly any muscular layer belonging to the integrasients in man, as in so many accounts, in some of whom it follow newly the while of their museular system. But there is heneath the skin a considerable layer of adipose tissue (possessor) with only remarkable in children of both sexes, and in women. This relinar and adipose layer has hern called in most parts of the body The admost faste is not present however the superficiel fastio. in all parts, being resisting under the skin of the syelids, the peris, Ac. This superficial fason may be considered as as integral part. of the akin, more it that scarrely he entirely separated from it. Init are lodged in various regions, any experiend entaneous veinand occurs. It conserves the true ship external an it, with all the parts which he desert, so that upon its integrity the life of the shin - a great session deposits. It is by its addening surface, therefore, that the skin receives its blood years and turner,

These are extremely numerous. The entimeous large are found in this structure.

808. Structure of the Shin. A section of the interconcuts made with a sharp keife, and then impected with a good glass, will show more or less clearly the following parts, some of which homever rest for the periods of their existence, not so much an inhairing enidears, as on experiment and analogical masoning. In-The Dermis, (cans vers, Irac skin, or obvious) 10. The papille, cureniur its surface. 35, and 15. The Rate Mossesum of Manight, admitted to be composed of two parts, riz. the pigmentum and marous faver. At. The Epidermis, cuticle of scari shim. As accessory parts there are the rade and hair, refuseous folloces, ressels, and nevers. The Dermis is the strongest and fundamental part of the integenents. It is extremely dense in some parts of the body, and thin in others. It also varies in individuals and the sexes. It becomes extremely thin in old age. The texture is difficult to describe, being composed of three intimately interfaced, and may be reduced to gulaffine by boiling. Its. elasticity seems to depend more upon the peculiar arrangement of its fibres, than apon its unimate nature. The papille seen upon its external surface may be examined in the palm of the hand, or aste of the foot, eather before or after removing the epotermis and rete mucosum. This is done by maceration and alight patrefertion. The dermis thus deprived of its epitiermic parts, should then be examined under water, and with a good glass. Lettle is known of the intimate structure of the papille, but they are admitted by all to be emisseatly vascular, and to be well provided with nerves-The rolper of the derstin is white in the whole human race,

Of the Lymphatic New Work of the Dermis. An extremely fine net work of Hymphatic vessels was proved by Maersgro to occupy the surface of the dermis, accord to the spidermis, and a deeper one accord to its adherent surface. This network of hymphatic coxels may be injected by puncturing the skin with a largest very obliquity, so as to raise the epidermis, and then interring the rule containing some quocksilver, the metal well occasionally penetrate these vessels, and ultimately inject in this way even the deep lymphatics of the body. These injections have tolerably well established the following circumstances. 1. The lymphatic network is more aperficial than the other vessels, and as quote independent of them. 2. Its vessels present disturbions here and there, and they have no valves. 3. They

do not open externally.

Epidemic Paris. The party external to the dennie were divided by Malpighi into two, viz. the rete moreous and starf shin, or upidenies. They were afterwards subdivided into four or more beyon, by Guelter and athers. More lately they have been all crainless under one, by the more of "epidemic parts, and this perhaps is upon the whole the best arrangement. In the meanance of may be useful, were a only for the sake of description to speak of them as composed of 1°. A piguication. The masses of Malpiphi, Av. The epidemia. It is on the alon of the negro that we not the pipemed contest. The numbers therefore must examine this part is the material increase of the tracker. The paperest which is formal in all persons, we plug. Although to imposed of small dark mediates, which some love thought unit. They are module to water, and are shown in present, the clauses structure algorithm is recent the regressit, these as yet only here may in the imaginaria of the whole.

Of the Mirrors Trans of Matheway. This is streamed between the three and egiderms, and the parment is asymptotical at al. Maleight called a senioration but it is doubtful if it be a notwaring a recombine supervise mness, and to probable congame; it must have a number of openings through it for the passage of filaments pring to so coming from the spinkruin which has upon it. Many anatomicts consider the recording of Malports as a part not drong syable amountably, and as being merels the onner layer of the protestine. There can be no ser one objection offered to the view, which arourds best with the unitrary of the languments of the whole; but it is to be abserved, that it is be no means difficult in show a distinct layer in the regression, between what is nearly called the epidermis and the dermis. This layer is very dark, and exist therefore he what Malpight understood by " pigment and retirulum." Some have supposed that the layer is the usual year of the worthed growth called "corna." This,

Investo, seems to be a mistake.

The Epitements and organization. It is a product of exercise, a hind of converse murur or heavy substance, very bygometric, runity removed where but in the living body. In tenture has some been said to to wealy but this is very much ful. In the whole, and as some think in much insolit, it were tuning out of rates or absoluunited to each value, and each receptor me of the nervous papille. of the domnie; the organs which fome it are not understood; being to bury ween soften tre on with advertises of any passes or floids through 3, unless merhanically introduced beneath it. The nature of the homests pass on from the only scent parts to it, and which may readily be seen by merely maing it up, it equally wiknown. Its unlity in preserving the budy soft and pitalte may be well observed in tearted nome he smoonly, these parts of the subject undertake drying up, and harmony speedily units for dissertion wherever the spickermic has been relibed off and loca. In respect to calcor, It is also because the second its oner surfere a morbed with a member of believe, which oversed the pervens popular of the dermin. The violation = in fact monided upon these, and furplales in each of them a out of about take; this, of course, is has seen on the extremities of the fragure and tues, where these pupilize are most highly developed. The epideresis attains to a great degree of clouders, where it is most exposed to pressure, as in the points of the lumb and soles of the tree. The extent to which it may be treerd lowerly upon the inuspus membranes mwarms the interior of the body has never yet been fully detervalued. It is generally approved to proceed as far as the cardiac orifice of the summerh; at passes into the uscales auditorius extertors, and is reflected over the integrment convering the mornhratio typical; this is easily proved by magazinios. It may be traced

a short way into the recome.

The Nails and Hair. The consideration of the structure of the nails and har appertains more to the "analogue of tissue," at " general austamy," in which the student is therefore referred for more extended details." The Numbers hard, flexible, clastic, and seniatron parent, of a harmy natury. They occupy the dissum of the last philappes of the fingers and then, and serve, perhops, an protect the elastic auchien or pulp, placed upon the palmor aspert of the same phalanges. The integoment covering this elastic custom is the parger estrument of much. Each mill presents a mic. a built, and a free part. The root is entirely consciled. Make a vertical, and longers final vection of the great the to see this, and to sinds the structure and connection of that buil generally. This shows that the root is the thinnest part of the anil, and a signaly method or southed. A very thick derain separates the und from the rest of the phalanx, which being very white, especially new the root, forms what is called the hands this dermin is very unuslar. Hy muorinties of a linger in water, it will be found that the nail and epidenton separate together from the outer parts; their interms amon and relations can be well studied upon a proposation of this kind. The nails are formed much after the same mode as the touth; they are totally mach sible, and here neither vessels nor nerves. The Hairs are also a kind of apidemic production, quite mensilee and inceptain, They present remarkable differences in the human rates. Their examination can only be made with the aid of the microscope. The following parts may be thus made out: 1%. The fullor follow implanted generacy below the dermis in the subentimeters cellular tissue. This is the formative organ of the hair. This bulk contains a pouch (membrana humalis) and a papilla; from the surface of the papilla, and exactly movided upon it, graves the beeny about or stalk. (. s. the lane. The bairs are formed thus by susceptions comes pushing up the preceding oney, in the same manner probably as feathers. The stalk or hair melf is merely a product of the organization; examined microscopically the external or homy layer is consulated as colourless, and filled with a coloured marrow or medmia. It appears not to be canalignated.

10%. Sessie or Tairr. The Trivia in structure enougly recephiles the common entryments. The error of taste is supposed to reside in the nervous papills of the organ. The appeal servest this sense has not been alregather demonstrated. The papillary sembrane others already to the nearther service, and a constantly month. In this membrane exist, as Malpighi first showed, all the elements of the ship. 14. A chorism. 19. The papilla, which receive numerous serves and band, resorts. 39. A lymphatic new
work. 49. According to Mapushi, a reflection or true microanism;
its presence is decised by sums assumints. To this may be added,
in the tengues of certain animals, a pagment. 59. An epotermia.
Albians called this the perspector. Most of these ports may be
made out by examining sections of the tengue with a good less.
The nerves of the tengue are very memorous, and get it is not an
acutely sortelide part. On each side it receives the moth or hypoglossol, the glosso photyageal, and the lingual branch of the information maxillary. The functions of these merves have not been
fully accordined; it appears tolerably certain, however, that the

hypogional is the nerve of motion.

610. Sexus for Sunat. The Nase, the instrument of this sease may be divided into two parts; 18. As external apparatus. properly called Now, and presenting a bear, darson, labe, and rest. 27. The missi forms and pitrictary membranes. The frame-work of the most is toseous, cartilegmous, and filmens. The paserus parts have been already carefully described; the cartilagious part when cleared of the integements, consists of. 19. The heard carninger and eartilage of the septem. 20. Cartilages of the matrila; usually recknowl five in all. The more accurate Sustaining reclaimed them The Allerons part is a filterens place, felling up the intervals between these cartilages. The skin covering these cartilages is remarkable for the number of semicentis fullifles at presents. The paultary membrane may be readily displayed by a vertical section of the empion and faco, made on either arte of the crista galli and vertical plate of the ethanoid. The membrane thus displayed is a fero-mocous membrane, investing the usual forme throughout their whole extent, and prolonged into the various sinuses in communication with the rusal fosse. These stouses are in fact approduces of the fosse. When thus covered by the pitulary membrane, the resal force present a very different appearance from what they did in the sheleton, in consequence of an many formula being either closed up or concessful. It may be novantayons, however, to re-examine the measures (there is number) of each nound, and to observe the peculiar appearance of the entracer of the variets entires and camb into tame passages. Conoccited with the suggrist mestus are the openings of the posterior ethnoidal cette and sprenoidal sinus; into the middle means outer the critics of the maximum since and of the infundingum, but to see these, and particularly the ordice of the sinus, either the middle purhinsped home must be farribly raised up or cut through, or the outer wall of the antron must be taken off with the cutsel and males or saw. The artice of the study, is large in the shelman but, when the suft parts are present, a mere slit. Lasely, into the inferior meales there only the rotal duct anterouty, whilst pasterney, but at a short disturce, will be found the photyagoal unified of the Enstantian miles which lead inco

the cavity of the tynopassin. The principly membrane is amineutly vascular; a layer of hymphane vessels is said almost to form its free surface, beneath which is a nett-work of vein; those do not communicate with each other. The nerves it receives are of two kinds, vir. the branches of the effectory, or first pair, and the usual branch of the splaintnic. Other branches of the fifth pair also proceed to it. The pitutary membrane is continuous with the one-guments at the anterior name, and with the nucous membrane of the planyax, and velum palatiposteriody. It forther process at many of the orifices of the casale and sinuses, algebt intils, which finisher contribute to memor these apertures. The application of begins to the pitutary membranes is our of the mass powerful means for reflexing deep inflammation of the area, for, its reins are so memories as to give at even the appearance of an arrestle thans.

att. Serve up Smar. The student seldom think of exmining the human eye whilst in a firsh condition, resting content with discreting these of slices and oxen. This, howeven, is a great error, insumuch as the eyes of those animals. differ in a great many respects from the human. It is, in like minues, a serious serior in studying the eye to endeatour to "get stup," (this is the plume) firm diagrams. No correct ideas whatever can be acquired in this way of any structure, human or enumerative, and the ferms or minus of parts learned after this fashion are uniformly found to escape the mamory in a few weeks. The student about if possible disset the human eye, to which the fallowing anatomical concepts amost exclusively apply. Remove the globe of the eye from the orbit, and carefully dissert from a the muscles, reseals, fart; leave the optic nerve attached to it; by this dissertion the student will have exposed the following timies. We the tunies selection and the courses; the funies conjunctive serie has been already described in speaking of the sachrymal passures (516.)

The Bell of the Eye has not the same direction as that of the arbit, its stars being that of the other eye. Viewest in profile, a appears composed of two distinct portions of a sphere of different diameters unded to each other; the anterior segment has the smallest diameter. The eye-half is moved by six muscles already described; it is forther revered anteriorly by the unical conjunction which probably passes over its whole anterior smales.

The televation is a filtrons membrane of great startight, thinner naturally than perturbatly i the tendons of the rections dies serve to said to its strangit. To examine the inner surface of the tunion scientoma, the membrane must be not through causinosity with a sharp leafe, and an uputing having been made into a, naturalize a pair of probe-pointed sciences undertestable and cut through the admitted at round the eye-ball, next reflect the pasterior regiment towards the uptic naive. This discretion exposes the greater part of the observed the examp nerves and vessels, and their partner part of the observed. The inner turiars of the

scientics is litted by the chonol to which it is fashly remounted throughout the greater part of its extent by should af calling those embring the clinity serves and vassels. Behind, the relutheier is perferred by a sounded opening for the passage of the upite nerve, the central arters of the retina and its year. Anterisidy, the transparent enems is amongly attached to the selection. The mode of attachment differs in different unimals , to men it is a simple leveling at the expense of the inner part of the schools. and mater part of the comes. The oderate adheres very intimately and strongly to the abound by means of the reliant legawent or attentor after which will be presently described. Before examining the channel, crowy serves, far. proceed with the exnumber and discovering of the corner Dissert of the stones. by pushing the 'probe-propied sciences under it into the antisrior chamber of the squeezes humour and in front of the itis; in thing on the appears human awages, for this does not interfere with the vivo of any of the pures. Cut the somes across, and take at off to two posttors, learning though at the same time the minerius of the annuius allow to the scientists; or by gestly detaching the unuplus allow from the inside the scleratios, the curmea may be removed entire, feating for examination the following purps was the channel and as vessels, and the many nerves t the animin alina and the irse

The Count is preferrly transparent, many circular, asteriodly curves, posteriodly consume, thicker thus the scherolies, but compared of att lambor of great attenuable having a second fault interpretal. Its neutrino by the membrane of the agreema new composence, its posterior by the membrane of the agreema humans. When the counts is punctured, this human escapes. It is shought to contain neither blood-accesses not nerves.

The Charact is a stack brown membrane, soft, calleder, and extremely exercise; it is situated because the schemeter and the states, and asternary is continuous with the trie, which seems to be a modelization of the object. By attending, the originary membrane perforates it to a comber of openings, andersorly the annual allow is attending fixed to it and in the trie, and the economics the one discrete, and the short adjustity to the schemeter, internally the combrane forms upon it the character and being continues forwards, constants the layer of the internal tip away. The dark schemes exhibit the preparation algebraic forms a continue to the character and internally; this preparations of the character and the state of the character and the continuous transfer and the common internal ages of the property attending at the common internal ages of the particular analysis.

The Liquing room Citiers, denotes the assume the set of a white or payors range control becomes the set or attach, the set, and the citiers, which it concerts together. Its texture is unadapted to the its 2 most of the citiery nerves pass through it, but some financial remain in it. Its own are in some pressure unknown, as

though it administry works the purpose of a ligament, which may he are of its area. The true charty processes of the abgreat eurrespond to its inner side, but my use in contact with it.

The file is a movemble contain floating in the aqueurs human; the remoded opening is its centre is the pupil. It thus expandes parefully the actions chamber of the equines humbur from the positror. The papil varies almost every instantioning the naking diste, becoming unafter a ben file ere is exposed to a streng light, and larger as the light haromes advented from the bashees inferred the manufactiv of the trit. Asserted the iris is savested by the membrane of the mureus humburs his second layer is the true nervous and filmus layer, which a also relained; the third tayer is the over, and the fourth the membrane of the premeationing. room. The enlary nerves are distributed chiefly to the iris; it is also very vascular. In the factor the pupil a shot up by a normbrane (mendeam popularis), discovered by Witchendor, and deserited with the greatest exactness by Dr. William Hunter: this membrane is double and visicilies at disappears principly phose

the erventh manth of the forus.

Charry Proveness. By removing a portion of the charmed and the inst and immersing it is clear water, the colory processes may be next examined. They are viscolar upon diaped enounces of the chaosil, placed soferiory and upon the mary side of the channel; externally they minere Emily to the channel, and seem to be but processes of it; internally each of them is united neemingly by a dove-tail, hot at all events must immunely, with a similar number of calcarles offers processes, ferming opposidages on the outer surface of the bya'did mimbring; there enhurless citizen processes of the hydrolane shee estimble the Zonale of Zinn, who lest spoke of them, but did not understand those mechanism," Pesides this divertibles, or intimate sister of the two sets of clincy processes, the coloured and enhances, or the characters and Application, removance Mand-versely pass from the one to the other. This is the recommender in the fresh eye these membrane adhere very intimately together, whereas, when the organ has been hope for a few slays, they represent from each other with the greatest may, became the asserter connected has been bosoned by patienteness. This mechanism, which was first surrord out to the memory just referred in, boy he'n altuguilter microscorerood oven by the lance writers. Taken roboctrialy, the chartiflan ciliary processes on called the ciliary hely. Americally their extreme prime floats little in the posterior abunhas at the squeeze homese behind the his. These budies me extremely coroller, and full of pigment, which also stains the Zamule of Zirm, when the photoidan educy parastant have been foreibly seen from it-

The Retine. To expose the retine, remove the riscood, the iris and ciliary processes, and immerse the opening numbler fall of elect-

^{*} See an account of this structure in the Yorks, Regal for, of Ediah talk as is to by Dr. Kinn.

water : (the inverted glass globs is not a convenient way of gasmining the emicture of this interesting membrane.) The retitu is a soft pulpy membrane, translucent, but of a slight grayish colour; many think that it is quite transparent during life. extends from the termination of the optic serve quite to the rdge of the zonule of Zine, and perhaps even further; it is composed of two layers, the inner called revealuse, the outer pulpose. In compliment to Dr. Jacob of the royal college of suggests of Dahlin, a third layer, still more external, has been order, our server, It some composed of a delicate filamentous timue, not demonsimble mics the preparation is under water, but may in every instance he floated off the pulpy layer of the retire, by immersing

the structures in clear water,

Central Spot. At afrost two lines to the notside of the purction of the optionerve with the retina is a dark spot with a yellow margin, first discovered by Soeromening. How the judpy layer of the perion is deficient, and much interest has naturally attached to the discovery, isosomeli as this spot (foramen centrale retime), is untunily in the axis of the eye hall and of value. It was supposed to be psculpr to man and apes, but this was dispossed, and its presence in the eyes of the chameleun and carrain frants is undeniced,* After all, the structure may merely be a cadimentary structure, of a nature analogous to the divided retire in the eyes of fishes; for the eyes of birds and some fishes and repules have instead of a mery foreseen, as in man and the chameleon, a divided retian, and occasionally also a surrapiant. These perulianties then in the human retira, discovered by Stemmering, may after all he merely radianentary.

The Agreeus Homear cannot by calcibrated like the other humours of the eye, as a doctnot structure, but its history may be well enough understood by the following description. This bumour is impid and transparent, filling the two chambers from the corners to the anterior surface of the membrane of the lens; the iros Boats in it. It amounts to five or or grains. When left to itself ir patrifies, thus aboveing the presence of some animal particles in The membrane of the approx humans has been already spoken of ; the fluid is reproduced very readily when it has been evacuated by accident or by the surgion. The remaining structures may now be removed from the interior of the ope-ball and examined, They consist of the following parts, I. The lens up erystalline humour ned its rapsule, and the liquir Mingagai. 2. The vitreous humour and its expende the tumes hysluides ; the

Zonule of Zonn; the Caral of Pent.

The Februar Hammer or Body, is soft, transparent and tremuloss; it resembles milled glass, and might to be called salvant, at in a nami-solid body. Anteriorly the last and its expende are indeed. in a depression of the vitrous number. The membrane arrestnarie throughout is the somebrase developer; this membrant is intimate-

^{*} See Transactions of Word, Am / year v. part for

ly united to the suppose of the line, then concerning these himours together; americally and externally its attion with the chorold is equally intimate by means of the gurale of Zinn, which we tave already explained to be a series of colourless eiliney procrosses, analogous to the chemidian ones, and with which they have a most inclimite easestlar union. The anterior concave surface of the vitreous humour is shut in by alayer of the hyalost memlimite, which however, does not aftern at this point to the capsule of The sound of Petit is firstened by a splitting of the hyaloid mendeane anteriorly for a short way into two lamine. The sister is called the south of Zinn, or hydodian clusty processes. The two layers sents after a very short course, and the membrane then unites to the sometical sames of the loss. The condwhich a imageliarly secolar may be demonstrated by opening its noter layer with sloop scisions, and Mowing air into it; when thus distinuted it resembles the colon in miniature. It is not antisquently partially or entirely obliterated during life. In young persons a branch of the central orders of the retira runs through the centre of the vitrence humour, to be destributed upon the posterior surface of the rapsule of the lens; but this resuct is afterwards obliterated.

The Crastaline Less is a transparent solid body incloved in a transparent expedie. To this capsule the bysion membrane adberes around the equatorial margin, and even perhaps passes over The lens has no connection whatever with its rapsule, so that on this being punetated the lens very readily escapes. In the solult the loss shows a mentral nucleus of much density, but its external layers my milt and theom; it seems composed of concentric layers of a structure, but little andentsod, nomitiscapping the inginious researches of Dr. Brewster. ly is this body, which becoming opaque, constitutes the minract. The liquor Mergagos, interposed between the capsule of the lens, and the lens inself, is thought by some to be a post marken appearation. In the event of the student not laving an opportunity of discerting the report lumari eye, he must of nedescrip avail himself of that of the eleep, ox, or horse. All these differ in truty respects from the human, but the principal points of difference undoubtedly are, the presence of the suspensory musries, and of the roloured part of the churoid, called the isparing It is this porming columnion which causes the glaring of the eyes

612. Susan or Heariso. The Entered Ear (Annele, Prince Annele), presents the following proximences and dependence. It The helix. 2. The grows of the below 3. The anti-helix. 4. The fosce weignders. 5. The trapus. 6. The anti-trapus. 7. The conclus. 8. The lobe of the two all these parts are availely found not, and require no particular description here. The structure of the nuricle is as follows:—The skin of the region is remarkable delicate; its selectors follows:

of the lower minute, and which of come does not take place in

the human species.

are sumerous. A corplaye constitutes the basis of the external ear, and by its configuration forms the provincers and depresnines just spoken of. No part of the cartilage enters the labe-There are becomes in the carrillage minutely described by Santarini. The ligenesis of the anticule are, a superior, an anterior, and a pasteriar; there are somewhat intermingled with the manches of The intranic supeles of the rar which are very readily found as some persons, line not is eithers, do not require here stry minute description; they are mitte and memory, and are manes, muse, tragiers; inti-tragieus; heliers mijre; heliels mime; transversus auriculus. The eminey cased naturals from the bettern of the roreto to the ravity of the tymponom. It is formed by a prolongation of the cartilage of the conclus, by a kind of foreits membrane, and by a body partion belonging to the temporal hone; it is losed intermily by the integraments. In its cartilarinous portion there are fiscages, incisure of Santarini, filled bowever with a filteen cellular tissue. The filesan portion of the canal completes it above and behind. The integuments proceed quite to the bottom of the passage, and cover the external surface of the membrana tympamexecutions glowly are sied with under the skin at the upper and back parts of the coral. The reveness systemed by these glands

is a vellowah, thirk, oily, and latter third-

The Cavity of ros Tympasing, or Minera East, ments from the anatomical student a very mayful examination. The eavity of the temperature may be had open from without and from below, by removing the auditory cared and mentions tympani; or from above, by removing with a strong scalpet or chiesel, its upper wall, which is merely the action or surof the base of the pure poness; a finance or kind of extent over upon the cerebral report of the bone, between the squamous and petrons parts of the bone, points not where the removal of the have through he effected. The more surface of the mustod process must be removed with the saw or closed and mailet; this will expose the masterd cons. At this stage of the disaction the superior branch of the vision may be traced into the portio dura-All this is best done if the bone conered by all ice soft parts has been immersed for some time in an acid and spirituous liquid. Mareover, the ravity of the tynesistem ment he exposes first upon a dried preparation, from which all the rott parts have been removed be more ation, or a preparation of this kind, as well as the result dissection, must be placed to face the student to make him to understand the indewing description of the tympumor, its politics and appendages. The Tratravels, examined first on the preserated and cleaned hone, and afterwards with all the soft parts, to a very irrestnariy straped eavity, placed between the bottom of the external auditory small and the labyrinth, behind the Emitaclean labe and in frust of the mental criffs. Its name wall is formed by the organizate tymposi, a complicated membrook, organizely filterus, and in young persons vascular. Upon the inner wall may be ob-

served, it. The fraestra oralis leading to the vestibule, this is eltard by the has of the stopes. 25. The promuntory below the francism names, marking the nonlinea of one of the scala of the cochles. 35. The fenestra minute, this hads from the tympations to the inner scale of the corbins. In the indepor wall of the tymposum may be wan the glenohi Issure, through which pass the hing process of the mollens and the corda tympant, the authorize massels of the malleus and some blood-vessels enter here-In the processe wall there is a coupl which hads to the mustaid with, also an entermed called the pyramid, in which there is a small opening. The pyramid marks a cavity which contains a small muscle, the angedous, Whose tendos passes through the small opening speken of. Helow the pyramid is another opensog, which leads into the could of Fallsquar; by this femmen the could typepen passes into the typepenens. In the asteroir wall there > the processus exchloratories, above which = the corni for the tensor tympane muscle, and below is the Ecstechian tube. By this tube, which is partly oscous, partit cartilagimus, air passes from the upper and bire past of the pharynx into the cavity of the tympatture. The cavity of the tympatture rostrins a chain of small lanes, Omirale Assistas, extending across refrom the membraru tyroponi to the deepest starger of the fracetra ovalis, or rather to the membraness vestibule. These are called, mailient, toron, or legalithmy, and stapes. The mailient is placed vertically as the cour and upper part of the membrana tymount; it has a look, sard, dands, and long process, desertion by Rew. The incus less budg, a superior branch and an inferice branch. The lenticular ficus is attendated between the long branch of the meas multile head of the stopes. This bone, the stapes much resembles a stirrupstron; its base is placed deep in the ferestra ovalue. Certain massles may those fames, which according to some, are four in number, but others admit only one, viz. the tensor tympani. It arises from the petrous portion of the temporal bone, ladder the inferior ordine of the camitid camil, and in part from the Eugarham tabe. It mayns the tymposum by the vicual simulty described, and is inverted into the process of the handle of the unilless. The other muscles which some here confeed, are, the hanter tympani, which arrays from the spine of the spheroid, and entering the fissure of Giassay, is inserted not the summit of the process of Baw. The stapedies has been already spoken of; it is very probably sur manufact, but comprised of the yellow clastic tissue; at least it is so in the lawer animals. A filtra-morous membrane invests the covery of the sympassim, Indie to inflammation, elevation, Act; the civily has been found fallen with pas in children not more than wight or tru days uld.

INTERNAL HAN OF LANGUAGES. This discortion must be made no echapies of different spen; the forming rathe most favourable, and several speningues are required, as different sections must be transp. To display the mobile, the contral portion of the laby.

math) open its upper wall, which corresponds to the suprilor surface of the pure pottons, on a level with the forestrangular; this opening such directly into the sentitude. At the case time resource the superior wall of the meates and perme dura. This will direct the found the partin mobile and perme dura. This will direct the stadent to the cooking, also us the cestibule and to the first part of the Fallopsia cand (rural for the portio dura.) The sent-circular cands are resired dissected in the measural base of the facts a the spency cosmas rissue surrounding them must be examined with the chiract or a strong orable. Of the first participating the labytingle, the vessioning is towards the section, the corchica anteriorly, and the semi-circular sames along and pean-

ricely.

The Femilia. If a probe he passed stro the Jenestra ovalle of the tymposum, it will pass directly into the vestibule. hence this opening has been called the tympanic opening of the This cavity is, as it were, the centre of the orternal cam. Intermediate to the seminorular corals which are external to it and somewhat behind, and to the suchles which is internal The openings leading into it my of two lands, large and small, the large are. L. The fenestra evaluation 2. The five mifers of the semicircular rounds. By The opening leading to the vestiledee scale of the enchlor. 4. Some admit an opening leading nowards the upper part of the fenestis ridnels. small openings are, 1. That which leads to the squedout of the vestibule. 2 Vestular operates. 5. Those by which the prethe multis enters. The occurs cavity we have just described, is invested by the membrosoms labyrinth; this appears to have been discovered by Components and Scorps; it is full of a liquid, to which M. De Bhilaville los given the name of the auditory vitime. The membraness labyrinth is not so extensive us the passons one. It If does not soon to pass into the eachles; and 2. It is evidently less than the assents scattlede itself, the mace thus left between the passons vestibule and the membranesus vestibule is filled by the liquor Coronic, Finally, the membraness labyersh is this composed of two parts. 1. A restribular portion. 2d. The membranurs sumirieralar tubes.

The Oscone Semicrolar Conste, are three in number, but opening into the vestibule by only five unifices, since two of them can together to form the attribute communic. Of these coulds, two are vertical and one horizontal. The superior vestical occupies the most elevated part of the labyrinth; in the fittus it may be seen almost without preparation. By one extraoraty it makes to the other vertical, to form the attributes remaining. The inferior scribed result forms almost a complete sircle. The horizontal canal is the smallest. In the interior of these usuals, are fitted the membraness semicipular results. The poetio mollistic and the membraness semicipular canals. The poetio mollistic state penatrates into these canals. In addition to the atendersons labyrinth than committed within the labyrinth and semicircular consist, there are evident traces of another membranes, which

neves by a perfections; to these cavities. The essents circles is a part difficult to describe, although its dissection, penerally speaking, he one of not much differenty. Its base rests upon the mentus autiturius internus. We dictionnish in the cachina 1. A compact plate forming the walls. 2. The lamina spiralis, which a a spiral segum dividing the general cavity into two others, called scalar Tim lamina spiralis proceeds from the base of the ruchles, and the neighbourhood of the fencitre rotanda to the southit winding around a central portion or axis. The lamina spiralis is temposed of two parts, an assesse and a membraness; it terminates in a process termed Assults or oufrom. The axis or collumnia, is the centre concless modellas columnia) around which the lumina spiralis turns. Its surface is full of links for the passage of the amintory perce. The scale of the speldes are distinguished into turn, a vestibular and a tymparic. The first communicates forcetly with the vestibule. the second with the tympanum, by means of the fonesica rotmels, but when the soft parts are present, this ceities is closed by a membrane. The equestors of the cornics has been already destriked along with the temporal limit. It terms to so be law previous the same uses as ascribed to it by Conunte. We comtime therefore to think modern French anatomists eightly in error is the view they take with propert to these squeducts.

The chaining Nerve, or partie seeins of the arrand poor, greater from the menture and tooms invertice, to the eribridium plate, where it divides into two partients, on enterior and posterior; the anterior proceeds to the exchlest, passing up into its interior by the axis or sphaneths, the posterior proceeds to the numbers.

one restibule and armountain carale,

PART NIL

ANATOMY OF THE ARTERIAL SYSTEM.

GIB. Duarses the preceding position vertices of this work, much at the arteries of the healy of the smallest importance to the argent have been combining described; but it may still be useful to insert here a systematic outline of the grantal system. A summery of this lead may be useful to the student as a reference to sold his memory requesting names and details, which should

however, in at far as is possible, he canonated with interesting practical, or physiological results. There are non-great armine

in the bidg, viz. the submining miver, and the north-

614. The Purscovany Aurieus spoints from the right on tricle of the livers, and a ways to the lines the whole at the dark or concertified. It is consoltable to this request. Like wise in his no accompanying voto. In the admit it has religiously in the angle and left. Two proceed to the major. In the forces of two a shirt branch, the according or verified which proceeds to the asserting this is obtained at logits.

this. The Amera springs from the left common, and termmes upon or a little below the fine-th hundar visit less, by directing into two great tranks, vir. the common thince. In this course this mera has been divided for convenious, and as giving greater precision to the description, into these convenious, etc., The drek: The December Theories a suit, The defended device

Arch of the dorte. There arise from this parties not sested, the accuracy arteries, right and left. These supply the substance of the heart will with blood. The fractio explicit. The h/t expanse constal. The h/t redecking. These vessels and their branches supply with blood the head and serie, and thousan extremities.

616. Basemo-Carmane, or Astrona Ispanicava, after a very short course, devides, into the most subdatum and right con-

- n evenido

617. The Cosmon Canorra divides opposite the byold bosse, into the external corons, and the animal contact.

als. The Extenses Canorro gives off one principal

lumeius.

(1.) The Superior Thyraid, whose branches are, Rome dipsidence Barres openficialis. Barres laygroom. Barres (byroidens.

(2.) The deteris Linguists. Its brambas and Ramus hydi-

deus Dorsalis lingue. Sublingualis. Ranim

(ii.) The Facial, or External Marabby Artery whose humeless are, 1. The Inferior pulation. 2. Totalliar. 3. Glandislar humbles, 4. Subsecuti. 5. Inferior labels, 6. Inferior commercy, 7. Mesosteric branches, 8. Superior resonancy, 0. Lactonal nearly, 10. Augusta, Ferr of these branches are of any consequence in a surgest point of view.

(4.) Arterio Marcalinia, or Signa-Mantid. This is not a very constant breach or the enternal control, more smally

arising from some other branch.

(5) Geopold dittip. Although a large and important viscol it gives off few branches, which have received names. It supplies many of the deep marries on the upper and back part of the neck, and chiefly the hairy scalp. Leathy, a branch to the ver (the posterior serie.)

(0) The Annalmy Pheramond.

(74) The Transporting Flerici, which just as often comes from

the temporal.

(8.) The Interval Marriday, whose franches are very tennerous. Mobile meningral, Interior Scatalia. Prerygoid franches. Deep temporal. Massacric. Buccal. Superior dental. Infra mbins. Descending pulation.

(0.) The Superficial Temporal may be considered as the termining branch of the superial variety. Its branches are, the missions of the Capardenas, Temporalis media. Posterior

Desgraral. Antenne temperature

of 0. The Larrage A. Canaran is the largest division of the comnon-month of the young person, but the smallest in the adult. Lee charry distributed to the lord. Its course is into the exposum through the ranged and of the temporal bane. It gives off a four small branches in the count, and in the savenness man; but it does not like the important branches.

(3) The Arteria Ophtholson. This artery enters the oplict by the optic finamen, and saids off the following branches: Lacheymally Control ordine Supra orbitalla, Ciliana, Musmbers. Ethnoidalis. Palpebrain, superior and referey, Na-

Trimcalis.

(2) Arteria communicates William. This artery arises from the everyal carotid in the interior of the communicates with the posterior cerebral artery, which is a temple of the basilar.

(a) The Ar. Greb. Asterior. This arrary after furnishing superpose small twigs, approaches the purrespending arrary of the

other side, when a short minerate branch,

(4.) The district Communicating determines off. This arrangement is so uniform, that it may be remediered the mount distribution, undernestions the Asterial credent Willia, by which is free constituted in maintained at the base of the brain, although the main tranks in the north about have been obliterated. The interior credenal arterias treminate in the acturies of the corpus collinger.

(3.) The dr. Cools Madie. This is a very large branch, fulbrating the range of the fissure of Sylvas, and imbedded in it.

1939. The Submarrans Austranas differ from each other in length, and in some other particulars. The branches arising from each are some the same. The right subclassian is a branch of the brachin-replaile and the left springs from the across. They in fact terminas at the bend of the ellow, but for the take of density than, have been divided into the following particus. The sakebrane, properly, as called. The anisony. The basered or tracked. The sakebrane position of this great artery gives off three important handless.

(1.) Arter Vertiberia. This artery is in every way a termulaable one, it gives self. Ar. Medicine Spiraliz, arterior and posterior. Ar cereleilli interior, or posterior, and ultimately making with the appusite vertebral forms, the Brailia Artery. The besides an arregions branch, and gives rise to the Arter, careful postuciores, which assessment with the arteria communicans. William, (2.) Marsonia Isterna. Its branches see Art intermetales autoriques. Art, mediantini. Comes nerve phermici. Massulo

physics Ablantation

(3) Aris Transidess. Its bounders are Interest thyroid. Germania accordence. Supra supplierts, or transversally homogly Protection secondar, or transversally rollin. Germania superficient revisable profession. As more at the subclavian artery has passed from under the subclavian muscle, it receives the same of

621. The Arilloy, whose hundringure, Theories agreemalis-Theories agreem. There also is, Thomas of some Solvenpularis. Internal of posterior circumflex. Automore several circumflex. The main trank again changes ity same as some as at has possed the lower margin of the tryes unjoy marche, and is

then called the

622. Bucked or Heneral. From its external side orse toly numeless muscular branches; from the internal side come off in succession, the arr profunds superior. Profunds inferior. Anastramor or magna. At the besid of the others the homeonical subdivides into two large branches, the radial and what

625. The Ulaw gives off right branches. The America and Posterior Recurrents. The interessed. The americand posterior carroll arteries. Reconstruction. Superficial pal-

mer each, from which once, the digital enteres,

624. The Radial Artery is mader than the ultur. Besides numerous unseniar manches, it there off earlit principal ones. Radialis returness. Superficially some Asterios and posterior cargal arterios. Dural arterios of the thombs. Arteria magna policies. Budialis sediess. Palmaris profunda-

625. (a. 615.) The Thornes down to the second distrement the

from it :

120 Art. Bespelitales.

617, Employee-

029. The Aleksainsf Asme is the third and last portion of the

sorta (61a.) There arise from it-

630. The Binner and Liert Principions Summarmanutario, 681. The Course Axis, from which urise, Art, postpica, to connects contents. Arteria bepoties. This branch gives off the potions experies, the postpica-dandership or applican dertin, and the right and left proper bepotite brackles. Arteria aplanters from this came the postpiciter power and magney the varsa bravat, the arterior splinners, and the pastpool planters assume the

of the arrey are, first. The large box sensions branches supplying the jejunum and illum with films. Sermilly, The marks like a collection of the collection

to be called the right superour colle-

683. The Isranian Mannerian Arreny gives off, thousand

saistra. Art signoides superior. Art, signoides inferior. Arteria humorrhaladia. From the sides of the aorta are given

634. ARTHREE CAPSULABLE

635. RESALD

tible SHRBBATICAL

637. LUBBALES.

608 ARTERIA Sacas Monte. This, through a small branch, is properly the terminating branch of the auto-

1009. The Arrian Inform Commons. These arteries re-

ply only a few owine.

640 The Arteria Biars Externs results from the bilimention of the common sites, and extends to the crural such, where, assuming the mane of ferroral, it ridelly supplies the lower extremity, and might with more property have from called the crural. As soon as it passes below Property ligament, at in called the common ferroral array. Before pushing under the crural arch, it furnishes two separation branches. The opigustric, The arterio committee committee or arterior committee or area.

641. The Green Ferenal Artery, after a course of an inches two at the most, subdivides not the superficial femoral and the deep featural. It are course it gives off, the apprairies se-

perficialis, enrumflex on superiicialis, pumea externa-

642. The Approximal Formal Array, by its direction, seems in he the continuous of the runness track; if discusses along the thigh into the populated space and after traversing at divides at the inferior margin of the population inner that two branches, the the protocor filled and amount about 2000 amounts, however, are of opinion, that the anterior filled artery or marriy a branch of the populated, and that the proper division of the artery is into potterior third, and filture. The approximal formal supplies several inners or branches, which have not received any same, and the exponential require.

643. The Populari Array, and amore this name it gives off, the internal supersor arrays, The external supersor articular. The middle articular, Array orallo. The internal inferior articular. External many one or Bessies these, it opposes a tramber of mission to. To array that divides

man the unterior ribid and the personne tiled.

644. The Arteria Proposala Fessors acrossoff, Arteria sincamflem externs. Circumdesa interna. Professora prima. Perhann

regunds. Perforage section

645. The Posterior Tituel delays the largest division of the populated gives off a few amounts for some han soon after substricted facts two arterios, we are already as proposed and the proper posterior trivial.

686. The Fibels sught to be cold the common fibels, then it soon after subdivide sate an automor and posterior tilolar.

They give off many muscular branches.

4 17

647. The Posterior Third, besides sending numerous muscular branches to the deep flexors of the toes, subdivides into the stemal plantar and external plantar; this latter as a large entry, which, besides girling off the digital branches, mustomosis freezy with the auterior titual.

648. The Accesive Tibul Artery passes through an opening in the upper part of the interoscent legament, and thus gains the anterior surface of the interoscents ligament. In its energy is sends off, The recurrens. Alony procedure learning. Internal mallicular. Expernal mallicular, Arteria tuni. Arteria nega-

tarsi. Ramus communicans. Arteria pollica-

649. The Internal line, or Hypogenetic Artery, results from the hifurcation of the economo iliacs. In hundres are numerous, important, and difficult of dissection. They are, The ilio-lambelis. Sacri-lateralis. Hamorrhoidalls media. Arteria vesicales. Umbilicalis (obliterated after birth.) Uterina. Vaginalis. Obturatrix. Glineal. Isoliadici. Arter pudica interna. The branches which the internal pudic gives of are, the external hamorroidal; artery of the perimann; transcersalis perima; arter, corporis hulboxi; arter, corporis reversos penis; arteria dorsalis penis.

650. It was first clearly amounced by Scarpa, though well understood long before his time by practical men, that the anastomeous of arteries throughout the human hosty are generally adequate to the supply of blood to most parts, even after the ligature of the largest trunks; the abdominal sorts itself was first by Sir Asticy Couper. A ligature has also been applied upon the brackies copialize, and although not betterto surressful, these operations may at some future time be the means of acting to

recoonging life.

PART XIII.

SYSTEMATIC ANATOMY OF THE VEINS.

651 Tur. Venes, (with exceptions to be afterwards particularly noted,) are vessels carrying dark or remoss blood; their form is cycindrical, and their parieties or walls are formed of two tunies. The outer is loose, extensile, composed of longitudinal fibres, and often surrounded with a shouth of cellular membranes, to which it adheres more or less maintained. The inner rout is thin and smooth, forming, by being folded as it were inwards, a vast number of semicircular valves; this tissue is also prolonged into the right cariffics of the heart and assumes of the dam mater. The coats of the wins have, of course, their arteries and class; but with the exception of the sem ports, few nervous filterants have been traced to them. When a handage is applied to the arm, as in philotomy, the course of the blood in the

superficial seins is obstructed. The vessels dilate, more particularly at cernain parts, the contracted parts indicate the estantion of the values, which in these circumstances, are allowing the vessels to get filled with blood, coming towards the heart, but preventing, or at all events retarding in successive shages, the redux lank. They perform this function very accurately, as no force whort of repturing the vessel sould pash any fluid along most of the teins from trank to broach. We shall now proceed to endeavour to group the vains, which by their union, ultimately form the inferior costs.

622 INTERNAL VERA SATREXA, commences on the inner odge of the great roe, extending over the dorsum of the foot, in the form of a transverse arch, receiving many twigs from the toes, a considerable sized vessel results from the source, which are not over the multiplus internus and askle-joint, it follows scorly a vertical course up the inner part of the leg, and passes behind the inner condyle of the femar. It then accords almost vertically on the inner side of the thigh. In this course it is entirely subcutaneous, embedded in the superficial faccia, and is constantly augmented by the addition of branches, when within about two inches of the crural arch, it receives several abdominal subcutaneous veins, particularly the superficial upigastric circumstex that and pathe, and, possing through the suphenic opening in the fascial late, irons the femoral vein.

603. The Extranal Vana Sarmina commences on the outer side of the feet, receives many twigs from the dorsum of the feet, and behind, but close to the malleoles externas is found as a single trink, which, having communicated by means of a large branch with the internal suppliers, seconds first obliquely, afterwards certificily on the back of the lag, and reaching the helion of the ham, dips deep into the populated space, and terminates in

the popliteal vein-

654. The Portificat, Vers occumpanies an artery with which the student will be familiar; it is situated first at the outer, and afterwards at the posterior part of the artery, and is formed by the union of three deep veins in addition to the external suphem-These deep veins accompany the anterior tihial, posterior tilial, and peroneal arteries. The populated thus formed, escends obliquely at the inner port of the thigh close to the artery, changes its name as the artery does, is increased by branches corresponding to those of the artery, and reaches the crural area, through which it passes, placed on the inner side of the ertery. As soon as the femoral tem has passed under the craral arch, it assumes the name of External Bloss, and its branches and course are precisely similar to those of the common aliae artery; in the male subject it remives a considerable vem from the envelopes of the testicle, which enters by the regional ring, and thus reaches the great voin. The Lettracl Hist, or Dypoguarise Vice, is placed in the excavation of the priving rather behind the ortery, and is formed of branches caucily corresponding to the divisions of that impor-

tant actory; it receives, in addition, however, some important veint, (vested vous) these are very munerous and of large size, and exhibit differences in the male and female. In the male they commence upon the mars pense, forming two large trunks pthe dorsal veins of the penis; there run along the dorsity of the peaks, wind sessent the organ towards the external repect of the corpora coversors, they have subdivide and form a ylexus with other years from the services, theres, and tuning vaginalia, they again seem to mide sets two tranks, poss tawards the reads of the corpora exversions, pass under the arch of the pulses, and ultimately reach the odes of the bladder. They here again unite and subdivide, represently forming an extensive plexus with veins from the prosture and walls of the bladfer, and again millerting into few trunks communicate with the internal iline vein previously receiving come evins from the rectum and verteally semimiles. In the female, the realest communes by the dough exist of the cliteris, which are at first minute and numerous, they ande around the vales, communicate with the internal and external pulie veits, and also beauther from the constricter various mustle, nationally forming on the sides of the vagina and thelder a very remerkable oferns, from which proceed tranks which communicate with the attenual illus-

650. The Sacan-Larrana Verse, accelerate with the vertained sineses, form a net work around the enterior secral form-

mins, and theo join the internal iller-

6.56. The EXYXMAL AND INTERNAL RESE. VERON unite on their respective rides of the budy, opposite the mero disc symplects, and thus gives rise to the resempt fline voice; these resents accord obliquely movards towards the inter-articular explicage termines for fourth and fifth lumine vertalize, where they make and form one good truns.

657. The Visia Cava Increase. The course of the vena cava informs through the abdonum, until it enters the right comels of the heart, has been already particularly described. In this course it receives, the middle sacral well, the limiter vein, the right spectratic using the rend, expending, hypothese or informs

plemic viens.

We have now traced the veins directly communicating with, and forming, in fact, the appropriate cave. There are will, however, some important points connected with the venues circulation within the abdones, to which we shall enture with advantage, having first traced the composition of the venue came superior.

note branches on the back of the hand, and mostles of the thumb; name branches on the back of the hand, and mostles of the thumb; name units upon the thumb into one trunk which takes the name of the ceptair vein of the thumb; this mank, and the other branches from the tack of the hand, accord, and gradually reach the america and external part of the fars sum, where they form the appendix of reach case. On arriving at the bend of the arm, the trunk is of transiderable site, and receiving the metion explain.

tein, assumes the name of the equivilence, recently along the external edge of the hiceps to the inter-moralar space between the great pectural muscle and delicid, when, passing under the classicie.

it joins the axillary vein-

650. Basing Varia, is generally larger than the captulin, it is formed by two branches, viz. the powerier white and automoralize. The posterior alone comments on the basic part of the back of the bank from a great number of months branches, forming everally a pretty large trunk on the inner part at the bank, radically the core salestific. This view accords upon the source part of the forestria, and assumes the mone of the automoral state of the area, it passes bakind the inner consigle and units with the anterior alone, it passes bakind the inner consigle and units with the anterior clear, it passes bakind the inner consigle and units on the anterior aspect of the area, receiving many branches anterior to the anterior aspect of the area, receiving many branches anterior to the inner consigle, a considerable trunk results, and receiving its half of the median via by a branch called the median backs, it ascends slong the inner part of the arm, dept deep somer or later, and constructions with the arillary veries.

600. The Mannan Vars is formed by a collection of runceous branches from the anterior aspect of the fore-sem, forming frequent amistomases with the deep vegas, and near the bend of the elbow terminates, one part going to the orphalic, the other in the limitic, under the source of median corphalic and median ha-

ullie.

661. Verse or the Provesat Expansions. The steries supplying the arm and hand with blood, have all their accompanying seens, generally two in number, on so each side of the artery, which unite until they are diminished in number to two, which enhance the bracking artery, areas moving with each other repeatedly, and treaving branches from all the collateral sein-corresponding to the brambes of the humand aftery; the lossific

also joining them, our large win results, six.,

662. The Asintant Vizz, signated enterior to the availary artery in the axilla, and extending from the tendom of the great personal muscle to the inferior extremity of the scalenus amicus, receiving in this course the caroundles, subscrapular, long thereach, superior theoretic, and arround veins. Whilst passing under the elevide, the sein charges its name to exhetivian which thus extends from the inferior margin of the orderior autitous muscle for a about way along the linear part of the neck, when receiving the internal jugular vein it receives the name of

663. Vexa Isomonisava. The night sem insumment is short, covered by the atemo-deside masted smooth, the atemo-derical articulation, and a small portion of the stemo. It is applied externally and postmonly against the right lamins of the mediactions, the postmo-gaute berse, the right subclavian artery, and evalence antena mastle. The left wan innominate is longer and larger than the right, its direction is nearly increased, it is reserved by the same parts, and/or abilition, by ready the whole heavilth of the atemum, and the muscles which are attached to it;

it covers in its crume the scalenes anticus muscie, the left subclasion artery, the left language of the mediantinum, the produce patric nerve, the such of the sorts, and the arteria innominate it receives analogous vains to the right, and in artition the left internal answersy and left referent densid. The two time innuminate also receive the extrahed and america intercestal veins.

664. EXTERNAL JUNE VIDE. The student in his dissection of the neck, meets with two great veins on each side. viz. the external and internal jugular voice, and in the mean line the thyroid venous plexus. These runs are subject to numerous varieties, two external jugulars, being often found on each side of the mek, in which case the thymid plesss will be small. We subjoin the more ordinary armagement. Immediately below the purotial gland, a large and soperficial rein is found, which has rereived the name of the external jugular; it results from the union of most of the veins accompanying the howekes of the temporal, internal maxiliary, and posterior surirular arteries. The enterval jugular vain descends nearly vertically along the lateral and antenor part of the week, under the platysma-medides muscle, it reaches the outer edge of the storestleido mustiod, and communicates with the subclavior a little externally of the internal jurniar vein, during this course it receives. some branches of considerable size, and particularly important to the surgeon; these are called the curyonal, entimeter, and trachelescapular veins.

663. The INTERSAL JUCCIAN VERY reminences by a dilatation, situated in a faces pointed out in the temporal bone, and named the jugular forsal, and descends along the outer side of the comoco carotic artery, and pressure perver, joins the saluciavan very other both this united into one trank, receives the name of the vera innounant, presenting on the right side the same direction as the vera may superior, while on the left in forms a right angle with the subcharam, and which disposition is

caused by the position of the heart in the class.

666. The Verse which give rise to the INTERNAL JUNCLAN VEIN. The summer of the sum mater described particularly in speaking of that membrane (563), collects the blood from the hrain, eye, part of the moul fosce, &c. by means of the following seins. The superior cerelmit veins, veins of the corner striatum, sein of the choroid plexus, werer Galeri, superson cerebellar veins, inferior cerebellar veins, lateral and inferior veins of the cerebrum and ophthalmic vein, the blood thus collected is youred into the slower of the dura mater and these terminate at the forumina lurers posteriors in the internal jugular verns. The hours of the crucium have a vern neculiar vesous circulation. The veins of the diplos are situated m the substance of the diplos of the hours of the shall, and lodged in perticular casals. They commence by numerous roots near the point where assification originally runmenerd; these trots unite and form branches which all tend towards the base of the

skull, a few branches enter the frontal rein, others enter the lateral similars and sleep temporal and occipital veins, they also communicate outside and inside the cranium by multitudes of occining brigs. The reins accompany the facial, lingual, phagrugeal, separate thyroid and occipital actory, all in a gross measure communicate directly with the internal jugular vein, and it might perhaps be sufficient to state this; they present considerable differences, however, and we prefer being meants, particularly in a part of the lody where so much annesty is felt by the

student for process and accumes description.

687. The Farnal Vers communers on the top of the head and forelead by a great number of branches which units to form on the middle region of the forehead the cose proposets, this win describes to the root and soles of the most, and here gets the name of angular cein and anastomesis with the ophthology. It is now called the fixed unit, and collecting all the branches corresponding to the facial arteries, it crosses the latter of the jaw, and generally reaches the internal jugular win after being joined by the runine, submental and pulstine veins. It often einds a branch to assess in forming the external jugular win also. This internal jugular stan also. This internal jugular also receives the lingual, pheryspeal, superior thy-

poid and occipital veins.

668, Viewa Cara Streamon. The Right and Left Vein Importants unite opposite the earlings of the first rib on the right side a little above the arch of the north, and the single trunk resulting from their union receives the name of the result of the result of the sound experior, it descends forwards and slightly towards the left as far as the base of the perinardium, the fibrous layer of which it penetrates, descending sertically to the right of the aora, and opensists the right annels of the heart, behind its free appendage. Before penetrating the fibrous pericantium, the sens cars sojenior receives the sens argues, right internal maximum and infesior thyroid visins, several thyroic, mediantical, pericardiac and superitor phrenic veins, but all from the right side.

660. OF THE VEINS OF THE STOAK MARROW AND THE VER-TIBLAL VENOUS SINCERS. There are two great similar extending throughout the whole length of the vertebral coral behind the bodies of the vertebra, before the dars mater and on the sides of the posterior common ligament of the vertebra. They commuments with each other by transverse similar placed upon the middle of the body of each vertebra; also with the intercestal and lumbar veins. The years of the spinal marrow open into

the inferior cerebellar value.

670. The Conorany Views of the Heart commence in the texture of the organ by roots which may best be travel from its apex. The great right coronary vein, the small right, and the left coronary vein all collect into one trunk which terminates in the right surfile of the heart. These veins have velves, but they are imperfect.

671. The Vena Pourse derives its origin from the some of

all the organ contained within the cavity of the abdomen, excepting the kidners, the bladder and uterus. But these veins urine to farm two principal tranks, the spirms, and superior mesenteric reins, and there two by their union, form the sens yorks. Of the two counts thus forming the portial vessel, we may first alluse to the splenic-vein; this collects all the veins energy anding to the branches of the splanic artesy, and besides in its progreat receives the doudered and pancreatic news, the curumary of the storach and the small mesanac at mesenteric wan which mins the splenic nearly at a right angle. The superior mesenteric win, the other great trunk which forms the portal veit_rallects the reins corresponding very nearly to the course of its arisries, and are in consequence named accordingly; these need not he particularly enumerated. The trunk of the went partie than formed, is placed at its commencement and in its course, lished the second portion of the deofesium, rowered by the hepatic actery, cystic and largatic ducts, and saveloped by the capsule of Glisson, and between the lamine of the small omention. next reaches the transverse groupe of the liver, and fertiles into two leanthes; these asparate nearly at a right engle, and thus form a begienntal emul called uses of the perts. They follow the division of the lapatic artery, and penetrating into the substance of the liver, subdivale after the manner of an artery the blood is a second time collected by the hepatic reins and posted into the inferior rays, and is thus said stemsferge a second circulation; a late chemical analysis has shown that the blood circulating in the tena pertir is not precisely like vanous blood.

672. PULNONARY VEINS. The vessels bringing the blood from the lungs toward the left safe of the heart commence in the lungs in a manuer out yet clearly made out; they all terminate in four large treaks which penetrate the left anciele of the leart. These have, for most of a better term, been called vesse. The course of the careallating finid in them is indeed from branch to trunk, but the blacel is pure arterial bleed. On the other hand, the primonery artery has been so named apparently from the blood crimalsting in it from trunk to branch like an artery, whilst the blood is in realize has coloured, and has perings precedure propur-

ties.

PART XIV

OF THE LYMPHATIC SYSTEM

672. Tuz Lymphatic System (Alesebani System), is composed of vanido and lymphatic conglobate glands. Lymphatic Ven-

sels are long, extremely deheate, pellurid tubes, presenting when full at short intervals dilatorious which give them a knotted anpearance, which appearance is ewing to the presence of valves placed in the interior of the tide, whose arrangement and function is altogether very similar to those of veins. The course of the fluid which circulates in these visuals is from branch to traink, and thus the anatomist has to indet them like the wars. from a branch. The disposition and assure of the extreme roots of these vessels are in a great measure, in consequence of this, completely unknown. The material used for imjecting them is quirksilver, and is a favourable subject, an extensive net-week of tubes may thus be displayed on the upper part of the thigh for instance. It is by this means indeed that anatomists have made out a great deal of the anatomy of these vessels, viz. that they are extremely numerous, and (with the exception of the brain, spinal shood, their membranous envelopes, the eye or the ear), found in every part of the human lordy, and more especially in the vicimity of the acternal and venous trunks. These vessels are arranged in the hedy in two distinct plants, a superficial and a deep seated. The Superficial are found in the parighery of the body, as a network placed in the sub-cutaneous callular tissue, and distributed a very neiform manner. The Drope Sented unite into bundles around the blood-vesoris, whose direction they exactly follow, these two planes communicating frequently by numerous twigs, and uniting to form pleases. Another curious fact to their frequest unions and divisions; so that a great number of twigs, after being collected into a single trunk, again reparate into twigs, and again unite. The lymphaties of both the inferior extremities, the abdomen, left side of the themx, left superior extremity, left side of the head and neek, terminate in one principal trunk, situated un the front of the two superior limitor, and nearly all the dorsal vertebre, and termed the Thorsey Dect; whilst the lymphatics from the right side of the head and neck, right upper extremity, and right side of the thorax, form a short trank situated on the right sade of the upper dorsal vertebra. We shall trace particularly the vessels, which terminate in these two trunks, but we must first call the student's attention to the lymphatic coughorate glands, which we have stated to form an integral and undoubtedly a most important part of the system. These glands very to diameter from the twentieth part of an inch to an inch, their colour commonly redesh, charging to grey, and even a blackish that; they are enveloped by a compact glistening membrane, and are furnished with numerous blood-vessels. When carefully anatomized, these glands appear chiefly formed by an intimate interiscement of the lymphatic vessels. These glands are collected together in greater or less quantity, or even isolated; they are not numerous along the limbs, but are in great atomizance on the abdomen and thorax; they are invariably simuled in a celluloso-adipose tissue, and the situations whose they are collected in greatest abundance, are between the layers of the mesentery (mesencence

glands), upwards of a hundred, around the year portse, and along the splenic artery (hepatic, passreatic, splenic), between the lamins of the mesocolon (mesocolic), along the two curvatures of the stomach (greaters epoploic), from six to ten, along the sides of the lumber verteless (lumber), in the chest, on the displeagen, pericandium, and anterior mediastinum (mediastinal), between the two layers of integrostal muscles, and in the posterior mediastinum, and at the roots of the lungs (broughtal glands). In the pelves we find the Appropriation; sorral, and external slop alonds, collected near the respective arteries. In the head and nock we have cravial, facial, and cereical; the certical are arranged into superficial and drep, and are very important; the superficial are found shriefly beneath the platysma myoides. in the course of the external jugular vein and its immedes; the deep-seated, (glandolæ concatenate) are found near the internal jugular sein and common carntid artery, forming a sort of claim from the mastoid process to the superity orifies of the thones, and prolonged backwards between the phanyix and vertabral column. In the superior extremity we find them following closely the brackial artery from the bend of the elbow to the exilla (exillary), where they are of great size and in considerable numbers; they be chiefly around the axillary vessels and their brunches. In the interior extremities a gland is very uniformly found on the lower extremity of the interesseous ligament (anterior tibid). In the popliteal space (popliced), they are pretty numerous, but of small size (whilst in the inguital region (inguital glands), they are of large site, numerous, and have been divided into superficial and deep layers. The superficial, varying from six to twelve in number, are found surrounding the internal suphena vein, imhedded as it were in that important structure, maned by surgeons the cribitform facia. The deep inguinal glands, varying from two to four or five in number, embrace chiefly the femoral artery. These glands are placed on the lymphatic vessels in such a manner or completely to break their continuity-some anatomists, as we have said, victing them as being formed by a microscopic division and interlacement of the vessels. Having thus lost, as it were, in the claude, the vessels proceeding from the organs, and which have received the name of the case informite, or effectatio, entrant, (the free margin of the valves in which vessels are turned towards the glands;) whilst from the opposite side of the gland, other vessels are seen as it were to arise, the free margin of whose valves, still looking cowards towards the termination of the system and consequently from the glands, have received the name of the rosa efferentia, egraticat lamphatics.

674. The Learnage Vessels or rate because Expanstress are decided into superficial and deep. The seperficial follow chiefly the source of the superme voice; the deep, those of the great blood resorts. The lymphates of the hips join the superficial inguinal glands; likewise those of the loss, the lower half of the walls of the abdomen, the lymphatics at the perinsum, acrotum, and penis. In the female, the lymphatics of the labia pudendi and elitoris have the sure termination. The deen obtainator, isobiatic, genital, &c. lymplatic vessels, arise near and accumpany the respective arteries, all terminating either in the hypogastric or lumber glands. The lymphatics of the nterns are of large size at the period of gestation, becoming small and perfectly ademocrate in the unimpregnated state. arise from the surface and in the substance of the organ, uniting with these coming from the vegins, to terminate in the hypometric clauds. Others course along the broad ligament, and unite with those of the crumum. They are very municipus, form. frequent pleanses, ascend along the spermatic vessels, and communicate with the lumber glands. The lymphatics from the bladder, kidneys, and supra-renal capsules, all communicate with the hypogasteic, lumbar, or splenic glands, and follow very closely the course of the respective arteries distributed to these organslymphatic vessels of the abdominal and pelvir walls are very numerous. They very generally accompany the arteries, and form the external thor lymphotic please, the hypogentric hospitatic please placed on the sides of the surning the lumber levelatio please. The lymphatic vessels of the intestines and stomach, particularly of the intestines, are of great importance. They are of two kinds; hyaphetics merely, which probably shiefly originate in the serous turne and fartraft. The Lartrafe absorb the chyle from the mucous surface of the small intestines; cituated between the laminus of the mesentery, they anastomose a great many times, and at last gain the mounteric and meso-colic glands; beween the intestine and the glands they are called the case offerentic; the seasels which leave the glands, and proceed to join the thoracie durt, are called case efference. The ismphatics of the stomach, great omentum, sphero, panereas, and liver, all ultimately join the thoracic duet directly or indirectly.

675. The TRUKACIE BULT (darks theresicas sirister) commences on the body of the third lumber vertebra, by the successive union of five or six large trunks, resulting from the assemblage of nearly all the lymphatic vessels and plexuses we have entinerated. At its commencement the duct generally presents a dilatation (receptaculum chyli) which gradually gets behind the norta at the anterior and left part of the second lumbur vertebra. The duet contracting, ascends into the chest between the crum of the disphragm, with the north on its left side, and the year azygos on its right, it ascends and continues to contract as far as the sixth dorsal vertebra, after which it dilates gradually, and ascenda beband the arch of the aorta to the left subclavion artery, on the inner side of which it is placed on the longus colli muscle. It then reaches the seventh curvical vertebra, bends towards and downwards, passes listing the left referror thyroid artery, and internal jugular rein, and communicates with the posterior part of the left sidelarian vein. Two valves are found at this point of junction, whose functions seem to be to prevent the blend circulating in the vein passing also into the duct. This duct is constinues straight, sometimes flexuous, whilst in some subjects it has been observed composed of several branches uniting and again separating. The duct, as it courses along the thorax, receives intercond hysphotics, and many branches from the liver, plears, displarages, posterior mediastics, &c.

676. The (amphatics of the lungs are superficial and drey search. They ultimately pass through the bronebial glands, from which vessels proceed to the right or imperfect thoracic duct, but the greater number proceed to the thoracic duct, properly so called.

6.77. The lymphates of the pactural extremible resemble in their general course and disposition, those of the petric extremits, being superficial and deep, &c. A considerable number of lymphatic clarks are collected in the stills. These become frequently the subject of surgical operations. The epicronial lymphatics, those of the face, and the superficial auterior lymphatics of the treek, chaefly descend to open in the left aide into the highest pare of the thoracic duct, and on the right side into the greatlymphatic second of that aide.

GLOSSARY.

A. The Greek a, used as a prefix in compound words, has a privative or negative force as a-stewar, basing no stereor attachment.

Abdomen, inis, n. (Abdo, to hide.)

Abducentes nervi. (Abdaco, to lead away.) Sixth pair of nerves.

Absorbents (Absorbeo, to suck up.)

Acetabulum, i. n. (dectum, vinegur; from the meriabulum or mement smoor in which vinegar was held.) Achillis, Tendo. (From the story of dehiller heal.)

Actinus, i. m. (The stone of grapes.) Small granulations comparing the substance of the liver and some other gendular bodies.

Acoustic. (Acres, to hear.) Belonging to the car, or to sound.

Acromion. (Asper, the top or extremity, and spor, the

Adductor, nriv. m. (Addure, to lead to.)

Adipese. (Adeps. fat.) Of the nature of fat : fatty.

Afferens, tis. part. (Affero, to bring.)

Ala. c. f. (A wing.)

Alveolar (Alaeus, a trough,) Ammios, ii. n. (Apros, a lamb.)

Amphiarthresis, in f. (Apple, both, and apépor, an articulation.) A movement of benea, partiting of Distribution and Symphosis, on in the taxal and carpal bones, and the northern

Anastomotis, in L. (Are, by, orong, a month.)

Anatomy. (Are, through, minong, and views, to cut.) It is now understood to be a seignre, whose object is the examination of the organs or independent of life. All tregalized bodies are the subjects of it. As living beings are divided into two great sections. Vegetables and Animals; so there are two kinds of Austony, etc. Vegetable stanlows, and defined Anatomy.

Anatomy, Animal, is divided into Human Anatomy, and Comparative Anatomy; according as it treats of the organization of the buman body, or that of other animals

Anatomy, Human, is divided into Descriptive Austomy, and

General Anatomy.

Amstoney, Descriptive, is divided into the Particular Assesse of Organs. Treating of the shape, and mutual relation of the numerous organs of which the body consists r and the Austony of Regions in Surgical Accounty, a very useful kind of Amstony, with which, however, the more student had better have as little to do as may be, in it can only be understood often he is master of the elementary Descriptive Assistance.

Asstony, General. (The second division into which Human Anatomy has been flivided,) treats of the structure and properties of the different tissues which are common to several organs; together with the minute examination of all the organs

and humours

Anchylosis, is: f. (Aprolos, plur, of Aprolos, a contraction of the terres or sizers; being often caused by the contraction of the flexor muscles.) The morbid consolidation of the articulating extremities of two or more bones which previously formed a natural joint; a still joint.

Ancon, onis, f. (Ayese, the cliow.) The triangular surface of the electronou process of the ulua; being the part on

which we rest when said to lean on the elban.

Antihelix, icis. m. (Aeri, against, and belie; because opposed to it.)

Antitragus, i.m. (Arth against, and trague; because apposed to it.)

Anus, i. m. (A circle.)

Aorta, c. f. (Aug. the air, and regau, to keep; because, being found empty in the dead subject, the uncients supposed it contained only sin.)

Aponeurosia, is. f. (Ano, by, and suppo, a nerve; became formerly supposed to be the expansion of a nerve.)

Apophysis, iz. f. (Aropiu, to grow from.)

Arachnoid Membrane. (Apagra, a spider's web, and

Arenatus, a, um. (Arcso, to bend like a how.)

Arcola, et f. (Dim. Area, a vacant space.)

Artery. (Also, the air, and rapes, to keep; because, being found empty after death, the extients emposed they contained air.)

Arthrodis, et. f. (Apôpoia, to fasten by joints.) An articulation admitting of motion an all ades-

Arthrosis, is. f. (Apthola, to fasten by joints.)

Articular. (Articulus, a joint.)

Articulus, i. m. (Dim. Artes, a joint.)

Arytenoideas, a, sent. (Aprenou, a funnel, and roles resemblance.)

Astragalus, i. m. (Arracyolog, a die shaped like the

unkisbene.)

Atlas, antiz, m. (Atlas, said to hear the world on his shoulders; because it immediately sustains the head, which is like a glolic.)

Atrophy. (A, priv. and raceps, to nourish.) Auditory. (Audio, to hear.)

Auris, is. f. (Aven, the nir ; because it is the conductor

(Junesta ha

Axilla, a. f. (Supposed to be corrupted from ago, to act.) Axis, is. m. (Ago, to Act.) The second vertebra of the neck. Vertebra Dentata.

Azygos (A. priv. and (oyor, a yoke.)

Basilaris, ir, e. (Barcheir, a king.) Applied to certain homes, actories, veins, pencesses, &c., from the importance of their situation, or being near the brain-

Basis, iz. f. (Baños, to rest upon.)

Biceps, cipilis, adj. (Bir, two, and capul, the head.)

Bicornis, is, c. (Bis, two, and corne, a born.)

Bicuspis, idis. f. (Bis, twice, and cuspis, the point of SE SHIPSE,)

Biffidus, o. um. (Biz. twice, and findo, to cleave.) Bifurens, a, ans. (Bis, twice, and firea, a fork.)

Brachium, ii. n. (Bospie.) The arm.

Bronchia, ovum, n. pl. (Bpóyxie, the windpipe.)

Buccinator, oris. m. (Bryonie, to sound a trumpet ; because it chiefly is used to doing us.)

Caseum, i. m. (Careus, blind; from its being open only towards one part.)

Calcuneum, i. n. (Calx, the heel.)

Canthus, i. m. (Karthe.) The angle, or corner formed by the junction of the syclids; the internal being the gurater and the external the lesser contline.

Capillary. (Capillus, hair.)

Capsula, et. f. (Dim. Capsa, a lox.) A capsule.

Capsular. (Copsula.) Belonging to, or of the nature

of a capsule. Capsularia, u, e. Cardia, ce. f. (Kapton.) The heart-Carpus, i. m. (Kopwoz.) The Wrist-

Cartilage. (Caro, flesh.) A pearly white, glistening, clastic, miferm substance, adhering to articular surfaces of bones, either moveable, or of a mixed character. Cortinges,

Caphalin (Kedalin) The head.

Cephalic Vein. (Because the head was supposed to be arrestly relieved by its being opened.)

Cerebellum, i. n. (Dim. Cerebrum.) The little brain.

(Kapa, the head.) The brain, situated Cerebrum, r. n. within the transien.

Cervical. (Cerviz, the neck.)

Cervix, icis. f. (As if verebri via; because the spinal marrow describe through it]

Cholams, or Cholams, a, um. (Xola, bile.) Belonging to bule ; hilling.

Chole, es. f. (XoAp) Path The bile : chole.

Choledochus, a, nar. (Xohn, bile, and Sexuan, to receive.) Receiving bile or gall.

Chondrology. (Xseepor, a cartilage, and hopes a discourse,) A dissertation or discourse on cartilages. Chambrabigin, or E

Chondrus, i. m. (A cartilage.)

Chorion. (Xujuu, in contain.) The second, or most

external membrane involving the festus-

Chyle, (Xidde, juice extracted by decoction.) The milk-like liquor, reparated by digestion from the chyme, from which the blood is formed; it occupies the historia (hence their name) and there is durt. (Ayon, is m.

Chyme. (Xenor, juice.) The pulpy mass formed by the food when it has undergone its first great change in the process. of agestion, and passed from the stomach into the doordenum.

CANDRAG, & III.

Ciliary. (Cilium, the syslid, or cyclash.)

Chylenla, et f. (Dim. Clonis, a key ; from its supposed likeness.) The could home; the conside-

Cleids. (Khur, the claviele.)

Clinoid. (KAiry, arbed, and rolor, resemblance.) Resembling a bed. Circuides, is. E.; also used adj.

Clitoris, idiz. f. (Klasse, to shut up ; because it is abut up by the labin pulmin).)

Coreyx, cugis. f. (Koon & the euckoo, whose hill is is supposed to resemble.)

Cochlea, ce. f. (Koxhur, a winding staircase,)

Coeline. (Knilan, the belly.)

College, a, was. (Colon.) Bulanging to the colon : enlie. Colon, i. n. (Knikos, hollow; because generally empty in the dead subject.)

Commissura, or. f. (Committo, to join together.)

Condyle. (Kowhoon a tuberclas) A round eminence.

of a bone in a joint. Confidua to be

Conglobate. (Conglobo, to gather into a ball.) Applied to a gland formed of emblored lymphone venue is having neither early nor exercisely duet. Conglobates, a, on.

Conglomerate. (Conglomero, to heap upon sum.) Applied to a gland formed of small plumerate glands, whose excretory flucts units into our. Construents, a, an-

Cornected. (Kopag, a raven, and rater, resemblance.) Shaped tiles a crure brake. Cornected, a, an-

Cornen, or f. (Cornu, horn ; from its consistence.)

Coronold. (Repairs) a crow, and solar, resemblance.)

Applied to processes of bones that we curved, or in any way
like a grow's bank. Coronoldon, a we

Cotyloid: (Noroto, a small drinking cup, orbs, likeness.)
Resembling an ancient drinking cup. Consults, in I., also

used adi.

Cremaster, eria m. (Korpin, to suspend.)

Cricoids (Spicor a ring, and often resemblance.)

Crista, et. f. (As if carista, from equ., the head.) A crest; anything like the comb of a cock. Assto Galb.

Crucial. (Cruz, a cross.) Like a cross. Crucialit, is. c. Crural. (Cruz, the leg.) Relouging to the leg, or lower extremity. Crivalit, is. c.

Cubital (Cubitur, the fore-arm) Helonging to the fore-

term. Cabitales, in a

Cubitus, i. m. (Cobo, to lie down; because the ancients learned on thir part, when tying along as their meals.) The fore-arm, extending between the show and wrist; the also, or or robbi.

Cuboid. (KaSar, a cube, or solid square body, and oba, resemblates.) Like a cube. Cuboida, b. f., also used off.

Cuswiform. (Cusous, a wedge, and forma, resemblances)

Cuspidatus, a. wo. (Cuspis, a point.)

Cutis, is. f. The skin. Cuvis vana. DERMIR.

Cystis, is. f. (Krorus, a bag.) A bladder. The membranous hag in which my morbid substance is contained: a cyst.

Dartes, i. m. (Aspus, a skin.)

Deferens, list part. (Defero, to convey.) Bringing

convaying.

Deltoid. (Ashro, and silve, resemblance.) Shaped like the Greek letter A. Applied to a transpalar morels on the aboutlet-

Dens, tis. m. (As if colens, from calo, to est.) A tooth.

Dermis. (Arqua.) The skin. See Cutis.

Diaphanesus, a. wes. (Ass. through, and mra, to shine.) Transparent, displances

Disphragen. (Am, and doorgo, to shut in.)

Diarthresis, is, f. (Ass, through, and nother, a joint.) A movemble articulation of bones.

Diastale, ex. f. (Amerekan, to dilate.) The dilatation of the heart, by whoch, with its elternate contraction (more) the circulation is carned on.

Digastricus, a, no. (Am. twice, and yourne, a belly.)

Dislocation. (Ass, out of, and locus, a place.)

Dorsal, (Dorsam, the back.)

Dundenum, i. n. (Duodeni, twelve.)

Enarthrosis, is, f. (Es, in, and address a joint.) The half-und-specket point; a variety of the class Diertirusis.

Encanthis, is, f. (Es, in, and sorder, the angle of the OFE.

Encephalon. (Es, in, and sepsin, the head.)

Ensiformis, is, e. (Ensis, a sword, and forms, likeness.)

Entero. (Europe, an intestine.)

Egicranial. (Ers. upon, and somme, the cranium.)

Epidermis, id. n. (Err, upon, and sparsor, the cranium.)

Epidermis, idis. f. (Err, upon, and squar, the skin.)

Epididymis, is. m. (Esq. upon, and & hope, a testicle.) Epigastrie. (Err, upon, and yourne, the stomach.)

Epiglottis, idis, or is, f. (Eme upon, and plasmis, the sperture of the windpipe.)

Epiphysis, ir. f. (Ezr. upon and due, to grow.)

Epiplaic. (Erankane, the omentum.) Belonging to the epiphoon, or ameneurs, Epiphicos or ma-

Epiploon, i. n. (Erman, to sail upon ; because it, us it

trees, floats on the intestitus, I

Ethmoid, or Æthmoid. (16)101, a sieve, and nost, resemblanes.)

Falciformis, is, c. (Falz, a scythe, and forma, resem-

blance.) Resembling a scythe classiform.

Fauces. (Pl. of faur, cir. f. the gorge, or mouth.) The eavity at the back of the mouth from which the pharyex and laryex proceed the jaws.

Fenestra, a. f. A window,

Filmin, e. f. (As if figilals, from figo, to fasten; berause said to fasten the tibio and muscles.)

Fertus, us. m. (Farto, to bring forth.)

Fontanelle. (Dim. Four, a fountain; because the pulsation of the brain is seen like the bubbling motion of the sand in a spring of water. The quadrangular space which exists for two or three years after birth. Increase the fromal, and the two parietal bones, at the junction of the latter with each other; betweet anterior fontanelle, or four pulsation, in distinction from a posterior one time-great shaped, between the occipital and parietal bunes. Fintanelle, or I.

Fornix, icis. f. (An arch or vault.)

Francom, i, n. (A bridle.)

Frontal. (From, the forehead.)

Ganglias, ii. n. (Poyykaw, a knot.) An enlargement in the course of a serve, resembling a knot.

Gastrie, (Carrap, the stomach.) Belonging to the stomach. Gastricu, c, we.

Generation. (Privation, to beget.)

Genio. (Percoir, the chin.)

Genu. n. indeel, in the singular number. The knee.
Ginglymus. i. m. (Tvyylouis, a hinge.) The hinge-like
jout, a variety of the class Dordress.

Glenoid. (Paper, a cavity, and case, resemblance.)
Having a cavity for articulation with another bone. Glenoids,

is, to a slow used adj.

Globate. (Globus, a ball.) Applied to glands formed of lymphatic vessels connected tagether by collabar membrane and posting out sgale, having no exerctory duct. Globates, e. un.

Glomerate. (Glowero, to wind round.) Applied to glands formed of a clos, as it were, of sanguineous vessels, basing an excretory duct but so cavity.

Glosso. (Pastro, the tongue.)

Glottis, idir. f. (Parrie, the aperture of the windpipe.)

Gluteal. (Phorres, the huttock.)

Gonsphosis, is, f. (Popoloso, to drive in a sail.) A surrety of the class Symuthesis, in which one tone is ford in another like a sail in wood, as the tenth in their sockets.

Guttural. (Gutter, the threat.) Belonging to the threat.

Gyri. (Pl. of gyrus, a circuit.)

Halo, onis m. ('Ales, a citcle.) The brownish circle

around the female nipple.

(Harmonia, er. E. (Apis, to adapt.) Harmony; a variety of the class Symuthosis, denoting such bewes as are simply joined together, as the name and other bones of the face. Hemisphere. ('Hurrer, half, and equips, a globe,)

Hippocampus, i. m. ('Irreinamit, a sea insect, with a head like that of a horse.) The arm-horse.

Humerus, i. m. (Quer, the shoulder.) The arm: the shoulder; also the long have of the arm, or huners, or or bracking BRAIRITIM.

Hyabiid. (Yokas, glass, and solor, resemblance.) Resombling glass : transparent, Hysfolden in f. ; also used adj.

Hymides, iz. f. (Y, and oduc, resemblance.) Like the Greek letter er hybrid.

Heum, i. n. (Eikes, to turn about: from its convolutions.) His. (Pl. of ile, is, n., the flunk.)

Impur, aris. adj. (In, not, and pur, equal.) Odd mers you

Incus, udis. f. . (A smith's anvil.)

Inquinal (Ingues, the grain.) Belonging to the grain. Inswering to the

Innominatus, a, um. (In, not, and monen, a name.) Without a name c atmosted.

Internodium, ii. n. et us, ii. m. (Inter, between, and sories, a knot, or joint.

Iris, idis. f. (A rainbow; from the variety of its colours.) Ischium, ii. n. (layer, the loin; from its proximity to the loin.)

Jojanum, i. n. (Jejanus, empty.)

Luchryma, et. f. (Angusa.)

Lacteal. (Lac, milk.) Milley: belonging to milk. Lardens, 5, 999-

Lacuna, a. f. (Lacus, a channel.)

Lambdoidal. (5, and 1100, resemblance.)
Lamina, c. f. (Elas, to local out.) A plate of metal.
Larynx, gis. f. (1400-ye.) The windpipe.

Lagamentum, i. n. (Ligo, to bind.)

Linen, at f. (Linem, a thread.) A line.

Lip. (Labinar, ii. n.)

Lumbricalis, is, & (Lumbricus, the earth-worm.) Resembling or belonging to the earth-worm.

Lumiris, is, c. (Luna, the moon.) Luxetio, owis. f. (Luzo, to dislocate.)

Lymphatic, (Lympha, lymph.)

Malfeolus, i. m. (Dim. Mallens, a mallet, which it has been apposed to resemble,)

Malleus, i. m. (A hammer; from its fineled resemblance.)

Mamilla, or. f. (Dim. Mosesso, the breast.)

Manuma, et f. (Manuer, the instinctive cry of an infant for the treat.)

Mandibula, w. f. (Mando, to chew.)

Manuferium, it. w. (A hilt, or landle.)

Manus, as. f. (The hand.)

Masseter, cran. m. (Macodo, to chew; locame it is employed in chewing.)

Mastoid. (Moores, the breast, and odes, resemblance.)

Matrix, icis f. (Moveps) The womb, or uterus,

Maxilla, or. f. (Marchia, to schew.) The upper, or losser just.

Meatus, uz. m. An opening leading into a carral, or duct.

Modiastinum, i. n. (Mediastave, standing in the middle.)

Medulla, or. f. (The marrow.)

Meningeal. (Mexico, a membrace of the brain.)

Mening, gis. f. (Marks, thins)

Mesentery, (Mores, the middle, and everyon, the in-

Mesocarcum, i. u. (Meros, the middle, and merow, the blind-gut.)

Mesocophedon, i. m. (steroy, the middle, and sequity, the book; because simulated below the senure of the lealer.)

Mesocolou, r. m. (Meros, the middle, and makes, the

Metacarpus, i. m. (Mero, after, and superar, the wrist.)
Metacarsus, i. m. (Mero, after, and values, the tarsus.)
Mitral. (Mitra, a mitre.) Resembling a mitre. Mitralis, p. c.

Molar. (Mola, a mill; because the molar (eeth grind the food.)

Mouth. (Os, oris, n.)

Multifidus, a. ton. (Molter, many, finde, to divide.)

Divided into many parts.

Myla. (MsAn, a mill; in allowing to the grinder teeth.)

Myology. (Msc. a muscle, and Argon a discourse.) The
decrease of the muscles. Myologia as it.

Myotomy. (Stee, a truscle, and represents cut.) Dissec-

tion of the trustles. Manualit, a, f.

Myrtiformis, is, e. (Myelum, a myrtle-berry, and forma, recombines.)

Nates, is. f. (Nate, to toster; because they slinke by the motion of walking.) Navicularis, is, c. (Naviculo, a little beat.) Beatshaped racicular,

Neurileman, atis, n. (Neuror, a nerve; and hipper, a covering.)

Nucha, at f. (The nape, or back part of the neck.) Nuclous, i. m. (Nez. a nut.)

Obsurator, eris. m. (Obluro, to stop up.) - A stopper up of any bole, or cavity.

Occiput, dis. n. (The back part of the head.)

Odontoid, (Office, a touth, and offer, resemblance,)
Resembling a troth in shape. Chlorosolo, is f also used offi-

(Esophagaus, a, sm. (turopeyer, the gullet.)

(Exophagus, i. m. (One to carry, and days, to ent; because it conveys what is exten to the stomach.)

Olfactory. (Offactus.) Belonging to the organ, or

sense of smell. Offactorius, o, am-

Omentum, & n. (Owen, a token; because the soothsayers drew owens, or sokers of good or but, from its impection. Omo. (Open, the shoulder.)

Optic. (October, to sec.) Relating to the eye. Opti-

DIO, O. HELL

Orbicularis, is, c. (Orbiculus, the wheel of a pulley.) Bound : circular, urbiculus.

Orbit. (Orbis, a circle: from its form.) The bony cavity in which the eyeled, &c. are estated. Orbitem i. p. Os. oraz. n. (Oroza, the voice.) The mouth. Applied

to the openings of parts.

Ossification. (Os. a bone, and facto, to make.) The formation of lone. Ossificatio, sain 6.

Osteogeny. (Orrior, a home, preso, generation.) The

growth of bones. Unleaguests, or. f.

Osteography. (Our iss. a bone, and proper to describe.)
The description of the bone. Osteographia is: f.
Osteology. (Our con, a bone, and keyon a discourse.)

The doctrine of the banes. Outcologie, in f.

Palatum, i. n. (Pala, to set with pales; in reference to the north, which are set second it.)

Palma, or f. (Hallow, in wield.) The palm of the hand.
Palpelore. (Pl. of palpelora, or f from palpito, to throb:
from their continual motion.) The spelids, upper and lower-

Pancreas, atis. to. (Um, all, and quies, flush; from its fish-like substance.)

Parenchyma, obs. n. (Hapsygow, to strain through,)
Parietal. (Paries, a wall.) Resembling, or belonging
to a wall. Parieta's, as, e.

Patella, cs. f. (Dim. Patiso, a pan; from its shape.)
The knee-pan. Royena.

Pecten, inic. m. and n. (A comb: from its supposed resemblance to an ancient comb.) The Or gashis, which is a distinct home in the found privis-

Pectoral. (Pector, the breast.) Belonging to the chest.

Pectaration in a.

Pelvis, in E (IIIAN), a bowl; from its shape.)

Penis, is. m. (Pendeo, to hang down.)

Pericardium, ii. u. (fligh, about, and onder, the heart.) Pericranium, ii. n. (Hesi, about, and source, the cranium.)

Perinseum, i, n. (Hepreiss, to flow around ; because it is

gesendly moist,)

Periosteum, i. n. (Hapi, about, and oprior, a lone.) Peritongum, i. n. (Heperies, to stretch all over.)

Perone. (Hepony, from mops, to traverse; because it

passes through or (neverses the leg.)

Phalanges. (Pl. of Phalanz, gir. f. a battalion of foot.) Pharynx, gis. f. (4vpsc, to conduct; because it leads

the food into the resophagus.)

Phrenic. (4poses, the diaphragm; being the plural of door, the mind, which the ascients supposed to exist in the displargm and parts immediately above it) Belonging to the displingm, Pleaning a un.

Pia Mater. (The kind mother; because it distributes

the vessels to the substance of the brain.)

Pisiformis, is, c. (Pisum, a pen, and forma, resemblance.) Resembling a past: ptsiform.

Pituitary. (Pituita, phlegm.) Belonging to phlegm.

Pilusterius, o. um.

Placenta, cr. f. (II\(\text{Dosser}\), a cake; from its resemblance.) Platysma-Myoides. (11\u00e4orie, broad, 100, a noisele, and ulus resemblemes.)

Pleura, at. f. (Hamps, the side.)

Plexus, ur, m. (Plecto, to twist, or knit.) A network.

Popliteal (Poples, the ham.)

Propure. (Prayata, to lop off before; because it is ent off in rireumciston.)

Process. (Procedo, to go forth.)

Prostate. (II,0), before, and iorqui, to stand; because situated before the unnary bladder,)

Psear. (Fon, the loins.) The loins : also applied to two

pairs of muscles of the loins.

Ptervgoid. (Hreing a wing, and edor, resemblance.) Resembling a warg. Prerygodeus, a, am ALETORNIS.

Putendum, i. n. (Puter, madesty.)

Pudic, or Pudical. (Pudor, modessy.) Belonging to the pulmb. Pudica, a ma

Pulmo, out. m. (therease, for verigue, the lange.)

The ting

Pulse. (Pello, to best down.) The besting of the heartlest along the arteres. Pulses, vo.05-

Pupil. (Papa, a babo, from the miniature reflection of

the present who looks on the

Pylorus, i. m. (troby an entrance, and orper, a guard; guarding in it were, the extrance of the bounts)

Rachis, cos. f. (Pages.) The spine.

Radius, il. in. (A hone of the flow-arm, named from its support recentlesses to the make of a wheel.)

Raphie, ex. f. (Pople, a seam, or minre.)

Rectum, i. n. (Because it was supposed to be straight.)
Renal. (Item) Belonging to the kidney. Resolution, is, e.
Rete, in n. (A net.) An interlacement of black,
nerves, or visuals, like network.

Retinn, et. L. (Hete, a net, or web.)

Sacrum, i. n. (Sover, sacred; because it was formerly offered in sacrifices.)

Sagittal. (Sagitta, an arrow.) Shaped like an arrow. Seginali, i.e.

Supheno, or. f. (Suppr. manifest.)

Sariorine. (Norther, a tailor; hereanse it is called into action in crossing the legs as tailors (in.)

Scalenus, u. von. (Seakiett, irregular.)

Scalpel. (Scalps, to carve.) A common, straight, surgical knote a dissecung knote. Analysism, i. n.

Scaphoid. (Soigh; a little loat, and oles, resemblances)

Senpula, on f. (The shoulder-blade.)

Seeletos, s. m. (2000) A skeletom.

Schindylesis, is, f. (Syndiania) to split into small pieces.)
A variety of the class Symmotonia, in which one bone is reorized into a slit in another, as the vamer into the spherital
bone.

Schneiderian Membrane: (Schneider, a German auntunist, who first discovered to.)

Scintice (Isolanticus,) Belonging to the isolaum.

Sclerotic. (2000000, to harden.) Hard : tough. Scleroticus, c., un. Sernium, i. n. (As if rowteum, a leather coats)

Scuttform (Scutum, a shield, and forms, likeness.)

Like a short Mangarate on a Payson-

Sella, or, f. (As if sodde, from sodeo, to sit.) A saddle, Sella Turcien. (A Turkish saddle; from its fancied resemblance.)

Semon, init. m. (Semmo, to now.)

Septum, r. n. (Neptus in hom in.) A partition,

Serons. (Serom, where.) Bolonging to serom. Sero-

Serum, i. n. (Sever, late; because some time elapses before it becomes apparent.) The greenid yellow fluid which opposites from the lossed when cold and at rest; sensity also, the where of wolk.

Sesamoid. (Eferance, a grain of Indian corn, and effect, resemblarces.) Resembling a grain of Indian corn. Sees.

without to the

Sigmoid. (2, and sides, likeness.) Resembling the Greek letter S. Signoider, in I calse used utip.

Green better S. Separader, b. 1 | also used adj. Sinciput, illis: n. (The fore part of the head.) Some Pari. (Without a follow.) Azyons.

Sinus, u.c. m. A cavity, or depression.

Solous, i. m. (Nolou, a sole-fish; from its resemblance in shape.)

Spinn, et. f. (Dim. Spica as if spiculing.) The backbase of spine, from the tham-like processes of the verteless; the vertebral column.

Splanelenie, (Σπλύχγου, an entrail, or viscus.) Belong-

ing to the canada, or ristera. Splenchester of the

Splean (Salvis, A purple, or livid-coloured, imperfect oral viscus in the left hypothonarium, whose function is not yet accommised. Splea, mis. f.

Splenius, if, m. (2xxin, the spleen; because like its.

shape.) A muscle of the rack.

Squamous Suture. That between the parietal bone and the squamous parties of the temporal hone; because the latter overlaps the former like a scale.

Stapes, edis. m. (Stat pre ; from its resemblance to a stimp, is which the feet much.)

Staphyline, (Zroduké, a graph) Like a grape. Sta-

phylinus, o, who

Sternum, i. n. (Erépres.) The ablong flat home at the fose-part of the absence, resisting in the young subject at several pieces united by cardlages, in the adult of three, of only two, and in the old subject office of one entire home: the breast-bone. Os Piecronis.

Storanch. (Sream, the mouth, and great to pour; the fred passing into it from the mouth and resplayment

Styliformis, is, a. (Stylus, a hodkin, and forms, resonheres.) Recombing a style, or leading registrom

Styloid. (Friday, a pillar, other likernon) Like a stake, or pillar, styliform. Sycholog, a on.

Stylus, it ms (A pin to write with on was saldedn.)

Supiration. (Nagiver, hold up.) The act of turning the pilm of the hand operation. Application over L.

Saturn, as f. (San, to any ingether,) A more, or atture.

The miner of flat bruce by their margine, as those of the
equivon.

Symmetry. (No. togothor, and propor, a nonasure.) The due and exact proportion of our thing to mother, or respect of the winter, Symmetric, or 6.

Sympathy. (Spendle, to suffer with)

Sympleysis, is, f. (200, together, and note to produce.)
A meteral union of bones, by masses of an intervening substance, a variety of the constraints.

Symathrosis, it. f. (20, together, orders, a joint.) An improvemble plot, a class of articulations having their varieties.

Synchondresis, is, f. (21), together, and yelden, a excitage.) A man of home by mean of an innevening cartilage; a species of supplying at of the police.

Syneurosis, iv. 6. (Six, together, and record, a norve; the term nerve farmerly including ligaments, membranes, and medians.) Union of bures by means of an intersecting membranes, a species of symphosis.

Symmetries, i.e. f. (Mo together, and coops flood.) Union of house by means of a kind of connecting mocas as the motivate to the stream.

Systolo, et. L. (Serrelley to draw legether.)

Tarnes : m. (Topolic)

Temple. (Temples, nein, n.)

Tendo, treis, or ante, on. (Tendo, to stretch out.) The

Tentarium, ii. n. (Tendo, to stretch.)

Testis, is, m. (A witness; being evidence of manhamal.)

Thalamur, i. m. (Odlanes.) A but. Thom, or f. (A sheath, or esse.)

Thorax ore, f. (Sepate a coat of mail : because 'it means the encern of the create.)

Thyroid (Oneta a shield, and down vesconblemes.)
Resembling a shield. Thyroiden a we. Scott over.
Titin, et. (A pipe) from its resemblance in chape.

Tercular, oris, n. (A mine-press; from torques, to mek. re torture ; because (he mapra are as it were, turrored in it.)

Traches, o. f. (Tanyon rough; from the inequalities of if a marriages, ?

Tengus, i. at. (Tonyor, a goat ; from the short lains that grow on it, in advanced info.)

Propezium, il. n. (Territory a four-sided geometrical Burure ; from its shape.)

Empranishm, on Practicing the trapezium, and silver, recemblement?

Triouspid. (True, three, and exaple, a point.) Threepublish Through shoot Trimpolitie, u. un.

Trigoninia (Ph of trigonious, a, am, three-fold.)

Trigiones, a, am, (Toric, three, and yards, a corner.) Torse-comment : tripmial,

Trochanter, 75, m. (Tolya, to run; from the use of the morries attracted to its]

Trochles, or f. (Todge, to runs). A pulley,

Turbinated. (Coped : made like a top, broad above and small bring.) Twimano, o, on.

Tympasum, i. n. (Turces, a drain.)

(Ima, re. f. (axing the ulsa, or cubit.)

Unciform. (Unov., a book and forwa, resemblance.). Re-Aling a anite Uneigerate, is, e.

Unguis, iv. m. (toot, a claw, or talon.)

Uredous r. m. (Odpor, urine, and sym, to contain.) Uredor, oriz. m. (Odpor, urine.)

Urino ('Home, to rush forward.)

Uterus, i. m. (Yerina)

Uvm. w. f. (Uw, a grape; from its colour.) The pusterior surface of the may which is owned by a derk-coloured. pipment.

Ventriela. (Dim. Fenter, a cavity of the body.)

Vermilormis, is, v. (Vermis, a worm, and forms, likemess.) Warm like a vermiforms.

Vertebra, or, L. (Ferte, to turn.)

Villans. (Fillus.) Take the pile of velves.

Viscus, reit, a. (Any organ, or part having an appropriority may as the bucers of the abdomor, or of the thouse.

Vitrenus (Former glass; from its charmers.) Besemhing gime. Vatone, or on-

Voncer, evin m. (A plougheshare; from its close rea emilianes.

Vulva, av. f. (As if what, a door,)

Wrist. (San.) Carpus, i. m.

Xiphoid. (Zidor, a sword, clos, resemblance.) Swordshaped. Xiphoine, is. f.; also used adj. Essuronaus.

Zygoma, atta. n. (Zoyon a yoke.)

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